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# Recalling a Momentous Convention and Its Results

## Reminiscences of the Birth of the National Electric Light Association and Its Achievements During the 36 Years of Its Existence—Men Who Created and Developed the Organization

By CHARLES W. PRICE
*Editor Electrical Review*

Six and thirty years ago, almost to a day, the National Electric Light Association was formed. Time has flown, the way time has, and electricity has come into its own since that 25th day of November, 1885, in Chicago, in a manner unexpected, unprecedented and awe-inspiring.

Reminiscences are not usually very interesting to the present-day reader; nevertheless, I shall take a moment to review the birth of the National Electric Light Association, with which began so much of the wider development in the electric illuminating and electric power fields.

There were about 100 in attendance at the first meeting of the National Electric Light Association held at the Grand Pacific Hotel in Chicago. It was an occasion of getting acquainted. There were more manufacturers than central-station men. The representatives of the arc-light carbon manufacturers and of the insulated wire manufacturers were the most numerous and most active. The Wallace carbon interests, represented by John H. Reid, and the Boulton Carbon Co. (now the National), represented by George H. Wadsworth, were quite energetically in rivalry, but outward peace prevailed. Among the representatives of manufacturers of electric lighting machinery there were present Elmer A. Sperry, of the Sperry Electric Light Co.; C. C. Curtis, of the Brush Co.; H. M. Cleveland, of the Schuyler Electric Co.; William Hochhausen, of the Excelsior Electric Co.; Charles A. Brown, of the Western Electric Co.; C. C. Warren, of the United States Electric Light Co.; Theodore P. Bailey, of the Thomson-Houston Electric Co.

Charles W. Price.

J. Frank Morrison, of Baltimore (Brush Electric Illuminating Co.), was a forceful influence early at the convention and was there—he bluntly announced—because his parent company had advised him to stay away.

And this brings to mind another early electrical incident.

When I joined the staff of the Electrical Review in January, 1885, George Worthington, the founder and editor, informed me the first day I assumed my duties that a convention of men interested in electric lighting had been called by the Review for the next month in Chicago, and continued in his quizzical way, "It seems every friend we have among manufacturers of electric lighting machinery is opposing it." This aroused my youthful Scotch-Welsh fighting blood — 36 years ago, yes!—and with confident youthful audacity I assured him the convention could be made a success—and for once I proved to be not a false prophet. The convention was a success and the association's history has proven its value and its importance. My zeal and enthusiasm were recognized by Mr. Worthington and I was delegated to make my headquarters in Chicago at once and devote myself to the preliminary work of the convention. There I became acquainted with many of the pioneer electrical men of Chicago, among whom, still living and claimed as friends, are Frank S. Terry, Elmer A. Sperry, Henry Hine, Charles A. Brown, Bernard E. Sunny and others.

The editorial call that brought the electric light men to Chicago was penned by Wm. A. Hovey, associate editor of the Electrical Review, and

was published in the ELECTRICAL REVIEW Jan. 17, 1885, in double-leaded form as follows:

THE ELECTRIC LIGHT CONVENTION.

We are requested by the representatives of a large number of electric lighting companies to print the following announcement:

A convention of delegates, representing companies doing an electric lighting business in the United States and Canada, will be held at the Grand Pacific Hotel, Chicago, on Wednesday, February 25, 1885. Every electric lighting company in the United States and Canada is invited to send delegates properly accredited. Delegates will find headquarters established at the Grand Pacific on their arrival.

I went to Chicago in full belief that with the organization of the electric lighting and electric power interests the opposition from the so-called parent companies would soon disappear and the doubting ones would become strong supporters. The history of the National Electric Light Association substantiated this belief.

The electrical interests of Chicago, few in number at that time, promptly took hold of the preliminary work of the convention and notices were sent out and correspondence carried on by a local committee. Active in this work particularly were Messrs. Sperry, Terry, Brown, Warren, Hine, George S. Bowen, and no doubt many others whose names are not at the moment recalled.

FIRST OFFICERS OF THE ASSOCIATION.

At a meeting of the early arrivals a day before the convention, held in my room at the Grand Pacific Hotel, it was agreed that Mr. Hovey, of the ELECTRICAL REVIEW should call the gathering to order, and that George S. Bowen, of Elgin, Ill., should be appointed temporary chairman, and H. D. Stanley, of Bridgeport, Conn., temporary secretary. This was done. The committee on permanent organization later reported the following ticket which was elected and constituted the first official list of officers of the National Electric Light Association, which it seems proper to have recorded here:

**President**

J. Frank Morrison.....Baltimore

**Vice-Presidents**

H. M. Cleveland.....Hartford, Conn.
J. H. Yarborough.....Nashville, Tenn.
E. R. Weeks.....Kansas City, Mo.

**Secretary**

Wm. A. Hovey.....New York City
(Resigned August, 1885)
H. E. Rhinehard.....Baltimore, Md.

**Treasurer**

Summerfield Baldwin .....Baltimore, Md.
(Resigned August, 1885)
Charles Cooper.....Brooklyn, N. Y.

**Executive Committee**

George S. Bowen.....Chicago
W. Hochhausen.....New York City
G. Donaldson.....St. Paul, Minn.
Frank Ridlon .....Boston
John R. Fletcher.....Dayton, O.
James O'Connor .....New Orleans

The proceedings of this pioneer gathering are reported more fully elsewhere in this issue. Two or three things I remember to this day with salient interest. One was the eloquent speech of welcome extended by Mayor Carter Harrison, in which he alluded to electricity with its power, evidenced in the lightnings, to "rend the granite of ages," and yet in the incandescent lamp shedding a radiance "as soft as the down on a maiden's cheek." The other was the startling statement of a delegate from Illinois, Dixon by name, that the "Good Lord is my engineer," which suggested the beginning of the use of water power in the service of electric lighting, and explained to the audience the remarkably low cost this delegate had given as his experience in running his plant.

The program for discussion, too, is extremely interesting—and is 36 years old, it should be remembered! Read it elsewhere in this issue.

At the meeting of the Committee on Organization of the National Electric Light Association, of which Mr. Hovey was chairman, it fell to my lot to write most of the constitution and by-laws.

The name still remains!

In fact, I believe the entire first paragraph is just as it was penned in room 34 of the Grand Pacific Hotel over a third of a century ago. Changing times and conditions have compelled, however, a complete remodeling of other sections.

From memories of the earlier conventions three rhetorical events are easily recalled.

THREE IMPORTANT ADDRESSES.

At the Boston convention, held in August, 1887, a banquet was generously given to the delegates by the Thomson-Houston Electric Co., held at a suburban summer resort on the coast. The banquet was presided over by the eloquent Dr. Otto A. Moses, of New York. What I particularly remember is the able, comprehensive and prophetic address delivered on that occasion by C. A. Coffin, then a leading official of the Thomson-Houston Electric Co., and now chairman of the board of directors of the General Electric Co. The great future of electric lighting and of the electrical industry was predicted and everyone present felt prouder of his calling after Mr. Coffin sat down. The world knows how greatly Mr. Coffin's efforts have assisted in making his prophecy come true.

The convention held in New York, in August, 1888, was welcomed by Mayor Abram S. Hewitt in most eloquent and enlightening words. It was then that he said to his electrical hearers, "You are the couriers of the coming millennium." Every auditor expanded his chest and looked an inch taller!

In some respects the most historical of the earlier conventions was the one held in St. Louis, in 1893, at which Nikola Tesla delivered a remarkable address relating to the development of higher voltages and outlining for the first time in all history, I believe, the eventuality of wireless telegraphy. It always seemed to me regrettable indeed that this brilliant man did not continue to follow closely for the honor of America this particular line of research and experimentation which was later developed by another gifted man, William Marconi.

Looking back across the wonderful span of 36 years of electrical development no one can fail to be impressed with the titanic strides the utilization of this potent and flexible yet imponderable

element has made. It is unparalleled in the history of the world.

### Reviewing Past Achievements.

In 1885 incandescent light was at the beginning of its career, and none of its modern refinements were outlined or prophesied. There was no electric railway, no electric fan, no storage battery of consequence, no long-distance telephone, no wireless telegraph or telephone, no flying machines depending on the electric spark, and the submarine awaited the electric storage battery; there was no Roentgen ray, and the transmission to far distant points of electric current economically was just beginning to dawn in the minds of scientists. The myriad adaptations as seen today in mine, mill, factory, residence, surgery and medicine were undreamed of. Any one of these developments would have been received with startling publicity in 1885, but today accepted as a matter of course, as was the wireless telephone message, which a few months ago was spoken at Arlington, near Washington, D. C., and was heard in the Eifel Tower, in Paris, and on an island in the Pacific ocean.

At the date of the first convention of the National Electric Light Association there were a few distinguished, and nobly distinguished, names above the electrical horizon, and electrical science was just beginning to burst into full flower. These were Edison, Brush, Thomson, Bell and Weston. These soon were followed by such inventors and students of science as Stanley, Steinmetz, Tesla, Marconi, Pupin, Cooper-Hewitt, Carty, Sprague, Van Depoele, Acheson and others.

The work of the association has been of tremendous influence and value. It is safe to say that electricity for lighting and power purposes would never have reached its almost universal utilization without this guiding organization. The work done by the many far-seeing and strong men that presided over the association's destiny can scarcely be mentioned in this limited space, but what was done and the results achieved can safely be left to electrical history and are recorded in the proceedings and committee reports of the several conventions.

The Association is now in close touch with those manufacturing interests devoted to the production of generating and connected apparatus, thus strengthening and enlarging the scope of the Association both technically and practically. In the early days there was some feeling between the operating and the manufacturing branches. A manufacturer was once inadvertently elected a member of the Association on the ground that his company operated an electric lighting plant. This proved to be *one* arc-light! This arc-light, it was afterwards learned, was used for testing carbons!

The divorce of the operating and manufacturing interests which took place many years ago has now changed to a happy family reunion which will undoubtedly prove of great and timely benefit to all electrical interests.

The first few years were largely devoted to the development and utilization of inventions. Then came the splendid work of the presidents of the association—Samuel Insull, Alden M. Young, Charles R. Huntley, Henry L. Doherty, Charles L. Edgar, W. W. Freeman, Joseph B. McCall, John W. Lieb and others, and particularly there should be mentioned the splendid initiative and successful efforts of R. H. Ballard of California (elected president in 1919), whose timely and wide-visioned work added new life and most important and valuable influence to the progress of the association.

Today with all this enriching history and guiding experience in the supporting background the association is steadily advancing, under the presidency of Martin J. Insull, of Chicago, and the dynamic energy and versatility of the association's executive manager, M. H. Aylesworth, to new heights and increased benefits for the electric lighting and related interest of the country as a whole.

The little pioneer gathering of 100 men from various branches of the electrical industry at Chicago 36 years ago has grown to an organization with a membership of approximately 13,000 —today undoubtedly the strongest and most influential electrical organization in the world.

Perhaps it is pardonable pride on my part that I was not too young (at least in my own opinion) to participate in the first convention, nor too old at this day to appreciate what has been done by the National Electric Light Association and its allies and co-workers in all branches of electrical science and electrical industry.

## FACTORS IN UNDERGROUND CABLE DISTRIBUTION.

In a paper on "Some Economic Aspects of Extra-High-Tension Distribution by Underground Cable," presented before the British Institution of Electrical Engineers, by R. O. Kapp, it was pointed out that, with the heavy cost of feeders on modern power systems, due to the centralization of the generation of electricity in large central stations, a saving in the capital outlay on the extra-high-tension distribution system will assume an economic importance comparable with that of reductions in coal consumption. Various means for keeping the cost of the distribution system as low as possible without sacrificing safety were discussed.

It was shown that the position of the power station with reference to its load influences the cost of feeders greatly, and methods of determining its most economical position were given. It was shown that the same methods can be employed to determine the most economical position of step-down transformer houses.

Rules were given with reference to the design of cable layouts and for determining the most economical voltage of transmission. It was shown that after an allowance for diversity-factor and standby cables has been made, the total kilovolt ampere capacity of feeders leaving a power station is still considerably greater than the maximum station load, on account of uneven sharing of the load, and means were suggested for reducing the discrepancy.

It was shown that on account of the capacity of cables to store heat, their safe continuous rating may be lower than their peak load. The true safe continuous rating is the equivalent continu-

ous load of a daily load curve, and a simple method of finding this was described.

It was shown that the cost of the unit of electricity depends to a notable extent on the consumer's load and power-factor, and, therefore, rates devised to encourage an improvement of both are equally to the advantage of central-station companies and consumers.

## HYDROELECTRIC PROJECT PLANNED IN CEYLON.

The government of Ceylon has approved the recommendations of J. W. Mears, electrical adviser to the Indian government, relative to the development of the Laxapana-Aberdeen hydroelectric scheme, and has ordered detailed surveys to be made. The scheme advocated involves diverting by canals the waters of the Kehelgomu Oya and the Maskeli Oya above their junction to a point where an effective head of approximately 2000 ft. can be obtained. The scheme also involves building storage reservoirs to equalize the flow. The consumers of the power would be the hill country, the Colombo suburban railways, the towns of Colombo and Kandy, tea and other factories, sewage-treatment works, and water-pumping plants for city flushing. As there is not at present sufficient demand for the full 100,000 hp. which will become available, it is proposed to make an initial development of only 24,000 hp., leaving future extensions to be performed in three additional developments as the demand for power increases. When the detailed survey is completed the plans and estimates will be forwarded by the local government to the consulting engineer in England, who will draw up conditions of contract on the lines already roughly detailed and call for tenders.

## STUDY OF THE FADING PHENOMENA IN RADIO SIGNALS.

**Absorption of Waves by Slightly Ionized Air Is Given as a Cause of Fluctuations—Further Investigations Are Being Arranged.**

When radio agencies were first used for long-distance communication it was noticed that signals were not transmitted as far during the day as during the night time. It has also been observed that night signals using the shorter radio waves vary greatly in intensity from minute to minute. More recently, since radio direction finders have come into use, it has been learned that great variations may occur in the direction of radio waves as they arrive at the receiving station during the transmission of signals from a given transmitting station. These and related phenomena have been recorded from time to time, and various hypotheses have been brought forward in explanation. The phenomena are dependent upon a large number of variable quantities such as weather conditions, the nature of the country over which transmission occurs, the surroundings of the transmitting and receiving stations, and the method of handling the receiving apparatus. Only by a statistical study in which the results obtained simultaneously at a large number of receiving stations are collected and tabulated may reliable averages be obtained.

Such a co-operative study is being carried on by the American Radio Relay League and the Bureau of Standards, tests having been conducted during June and October, 1920, and January, 1921. A further series of tests will be carried out in April. In these tests from five to 10 radio stations transmit signals in succession, these signals being received simultaneously at about 100 receiving stations whose operators are provided with forms for recording the variation in the intensity of the signals as received.

A paper presented before the Philosophical Society at Washington on Jan. 29, described the results of the tests so far conducted and proposed an explanation of the phenomena. This explanation associates the long-distance radio transmission accomplished at night with the boundary of the highly conducting outer portion of the atmosphere, which is also the origin of auroral disturbances. Fluctuations in intensity are probably caused by irregular absorption of the waves by masses of slightly ionized air through which the waves travel in their course. The fading phenomena are closely associated with the strays or atmospheric disturbances which affect all radio communication.

## FILING SYSTEM REVISED TO COVER RADIO LITERATURE.

The radio laboratory of the Bureau of Standards has prepared a tentative scheme of classification of radio subjects, which has now been revised as an extension of the Dewey decimal system and is useful in classifying radio references, drawings, books, and reports. The whole subject of radio communication is put in its proper place in the Dewey classification—621,384—but it is suggested that these figures be abbreviated to the use of the letter *R* in a purely radio library. An abbreviated classification is provided for the use of small libraries or collections. An alphabetical index enables one to refer readily to the classification number of any subject desired. The main headings into which the subject of radio is divided are as follows:

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| R000 | Radio communication. |
| R100 | Radio principles. |
| R200 | Radio measurements and standardization. |
| R300 | Radio apparatus and equipment. |
| R400 | Radio communication system. |
| R500 | Application of radio. |
| R600 | Radio stations—operation and management. |
| R700 | Radio manufacturing. |
| R800 | Vacant. |
| R900 | Miscellaneous radio. |

It is desired to make this classification as complete, comprehensive and usable as possible, and the Bureau of Standards will send a copy of the complete classification to any persons interested.

## PUBLIC SERVICE CO.'S POWER LOAD SHOWS INCREASE.

Data compiled by the Public Service Co. of Northern Illinois show that between Jan. 1 and Dec. 4, 1920, the new contracted electric-power load amounted to 22,096 hp., the total for the corresponding period in 1919 being 21,249 hp. From January to December, 1918, the new connected load was 18,004 hp.

# National Electric Light Association

## First Convention, 36 Years Ago and Proceedings Reproduced in Full—Complete List of Presidents Since Its Organization and Places of Meetings — First Constitution and By-Laws Adopted

The first suggestion of a definite organization of the electric-lighting interests of the United States and Canada was contained in an editorial announcement that appeared in the ELECTRICAL REVIEW of January 17, 1885.

This announcement had been preceded by several editorial suggestions that such an association should be formed, and immediately following its publication the ELECTRICAL REVIEW received many letters endorsing the call and favoring the date and location. The far-seeing editorial eye had again, as often before and since, been the means of getting progressive forces to organize and unite for mutual good. At first several of the companies engaged in manufacturing electric-light apparatus, and that were licensing local lighting companies, were lukewarm about the benefits likely to result from the convention, but this feeling soon gave place to hearty co-operation, and the National Electric Light Association has been a successful, growing and valuable organization for its members from the day it was formed.

The first report of the meeting was telegraphed to the ELECTRICAL REVIEW, and appeared briefly in that journal, published in New York, February 28, 1885. The following week a report in detail was published, and is presented here in full. The discussion is of much interest, as indicating the state of the art and practice at the beginning of the year 1885. The report is taken from the columns of the ELECTRICAL REVIEW exactly as printed on March 7, 1885, and there is appended a list of attendants that was published in the same issue.

## The Electric Light Convention

REPORT OF THE PROCEEDINGS.

Representatives of the various electric light companies and interests, to the number of upwards of 100, met in the city of Chicago, at the Grand Pacific Hotel, February 25. The convention was called to order at 11 a. m., by Wm. A. Hovey, of the ELECTRICAL REVIEW, who stated that the call had been issued on the request of a large number of those engaged in the electric light business, and that the objects were to perfect a permanent organization, arrange for annual meetings and the discussion of such questions as would be of interest and benefit to all members of such a convention. George S. Bowen, of the Van Depoele Co., of Chicago, was elected temporary chairman, and H. D. Stanley, of the Bridgeport Electric Light Co., secretary *pro tem.* Mr. Bowen, on taking the chair, alluded to the embarrassments and depression that had been felt in the electric light business during the past year. The appliance of the light was but yet in its infancy, and many difficulties had surrounded it. During the last twelve months those in the business had been subjected to peculiar trials, but he had every reason to apprehend a brighter and more prosperous future, which he hoped would be inaugurated this year, and he was confident that some substantially valuable results would grow out of this convention, including as it did many well-known representatives of both the manufacturing and operating divisions of the business from all parts of the country.

A committee on credentials and permanent organization was appointed, consisting of the following gentlemen: C. A. Brown, Chicago; C. J. Richards, Racine; G. H. Wadsworth, Cleveland; Frank Ridlon, Boston, and S. Baldwin, Baltimore. Also a committee on program and progress of business, consisting of Messrs. Randolph, Crossman, Reid, Scribner, Buckley, Hovey and Bowen.

At 2 p. m. the convention was welcomed to the city of Chicago by Mayor Carter Harrison. He hoped that their deliberations would be careful and wise, and out of their deliberations there might be more light. They had to deal with the most subtle of fluids. It was the greatest agency handled by men. No man knew its power, but that should not discourage them. Electricity was the breath of the Deity. It was all powerful, yet harmless, when not too contracted. It was for them to work so that it might be harmless. He touched upon the recent telephonic achievement of talking from Chicago to New York; alluded to the increased facilities of the submarine cable service, and ended by speaking of electricity as "a giant force, powerful enough to rend the ancient oak and melt down the granite of ages, yet in the incandescent light it was made as soft as the down upon a woman's cheek, while in her glossy tresses it aroused a spark, even if it did not generate one."

Prof. Elisha Gray was then called for and spoke of electricity as the greatest wonder of the century, of its need of development, and predicted that we were but standing on the threshold of its windows.

The committee on organization reported the following for officers of the convention: President, J. F. Morrison, of Baltimore; vice-presidents, H. M. Cleveland, Hartford, and J. H. Yarborough, of Nashville; secretary, W. A. Hovey, ELECTRICAL REVIEW; Charles A. Brown, of the Western Electric Co., presented a gavel to the new president, remarking: "It represents a commutator on an electric light, and I trust that the convention in its deliberations will have as cohesive a number of segments."

Mr. Morrison thanked the convention for the honor, and in a brief, practical address opened the convention for the business that had brought many of the members hundreds of miles.

The committee on digest of papers and program of business reported the following order of proceedings and topics for discussion:

1. Incandescent light, particularly in regard to length of circuit upon which they can be run with a profit.
2. Locating and avoiding crosses with telephone wires.
3. Power and its conversion into light.
4. Electric light globes and shades.
5. The best modes of connecting dynamos with power.
6. Electric lighting by water power.
7. Rates and rebates on electric lights by the year.
8. The use of electricity as applied to motors.
9. Where an electric-light system requires No. 6 conductor, is it desirable to use Nos. 6 and 4 in the same line?
10. Will armatures become affected by frost when exposed in transportation?
11. Special insulation or guards to insulation of lines at dangerous points and places.
12. Street lighting—the best manner and modes of accomplishment, embracing the location of lights and running of circuits.
13. Experience and results in the use of underground conductors.

14. *Resolved,* That the fireman should receive more pay than the engineer.

15. Help generally.

16. Experience of electric-light companies in the use of copper-coated and uncoated carbons.

A letter from Mr. A. S. Hibbard, superintendent of the Wisconsin Telephone Co., addressed to Mr. C. A. Brown, Chicago, relative to the respective rights of telephone and electric-light companies was read by the president and submitted to the consideration of the meeting. The writer felt that the telephone interest should be considered by the electric light convention, if only for the purpose of discussing the mutual rights and equities in overhead wires. The telephone man's complaint against the electric light companies is that in a number of instances the rights of the telephone companies are disregarded entirely. They allege that the light men have built lines along the same side of the streets with the telephone wires, either above them or underneath them. It was well known that there is a heavy induction from electric light wires on to telephone wires, and as a result there were loud and disturbing humming noises on all telephones in all localities where the electric light wires were. Enough had been shown in the experience of telephone companies with the electric light to prove that there is danger in too great proximity. While they had no desire to place impediments in the way of electric light companies and wished to be friendly n e i g h b o r s, they thought it would be best that they should be next-door neighbors and not attempt to occupy the same house.

J. Frank Morrison,
First President of the National Electric Light Association.

Professor Gray said induction troubles might be avoided, but this involved expense. Wires could be laid in the ground and so protected as to prevent induction, but there must be some conducting substance between the two wires. Lead pipes had worked well. Another way was by the metallic circuit. This would cost the telephone company two wires instead of one. There would be no danger from grounds, as the electric light company has the metallic circuit. There was no way to prevent crosses with overhead wires. The wires should go uppermost which was the more liable to stand. Where they cross at right angles there is no induction, only where they run parallel.

President Morrison said the question of induction was a bug-bear. Professor Gray had skillfully gone around the question and touched the telephone side of the question, avoiding the electric light companies' position. When the electric light was a success the telephone companies commenced the outcry against the electric light companies and desired the latter to go on other streets and keep out of the way of telephone wires. The electric light was not a luxury but a necessity, as much so as the telephone, and the light should be allowed to run on the streets if law and order was to be preserved and the police kept tolerably safe. A properly constructed electric light was not dangerous any more than a buzz-saw in a sawmill. Telephone wires could be run alongside of electric light wires if insulation did not rub off. Every city, except Chicago, had given the right of way to electric light companies.

Mr. Hovey said that 78% of the fires in New York by wires were from those underground; there were 20 times as many wires overhead as underground. Professor Gray said the telephone and electric light interests were mutual. What was wanted was to arrange the circuit of the two systems to the best interests of both. He recommended the establishment of telephone and electric light stations for observations to trace out phenomena, and facts thus secured were better than theories. A recess was taken until 7:30 o'clock.

After the evening session had been called to order the subject of "Electric Lighting by Water Power" was discussed. George Fletcher, of Dixon, Ill., created considerable amusement by a description of his plant for furnishing electric lights. He said he employed water power, and was asked who his engineer was. He said the Lord furnished him an engineer in the shape of a turbine water wheel which was 17 years old and cost $1250. His carbons cost him $15 a thousand, and he ran 30 lights. The wheel ran a sawmill and electric lights as well. The cheapness of this plant and Mr. Fletcher's manner of stating the facts convulsed the convention with laughter. "The best mode of connecting dynamos with power" was then brought up. Mr. Ide, of Springfield, then gave a description of the plant of his company, and was followed by Mr. Steward, of Chicago, who said the best means was belting direct from the machine to the dynamo. Mr. Weeks, of Kansas City, was of the same opinion. Mr. Sperry, of Chicago, avoided a perpendicular belt. There was a disadvantage in using a too heavy or too thick a belt. President Morrison said the New York Co. at the start used the single pulley on the dynamo. This was abandoned and a Corliss engine, with a gear-wheel, put on. In Philadelphia they had 16 engines at the start, with 16 dynamos, belted direct from the engine to the dynamo. This was too expensive and two engines were introduced of 25 hp., driving the main shaft and belting down to the machines. In Baltimore their shafting ran the length of the engine-room, with two rows of dynamos. The engines were belted to the line of shafting. A Corliss engine was first used and then Buckeye engines of different power. The Frisbey clutch-pulley was discarded, and a line of shafting put on top of the joists. The shafting of the dynamos was changed and tight and loose pulleys used, and since this was done no trouble had been experienced. It was his opinion that the friction clutches were useless.

Mr. Weeks, of Kansas City, inquired about the rocking-grate bar, but no one had used it. It was stated that washed screenings had been used advantageously. Inquiries were made concerning smoke-consumers, but it appeared the elecric light companies did not use them. A skillful fireman was said to be better than the style of furnace in use. The use of blowers was favored by some and opposed by others. A variety of views were expressed concerning the utility of the Jarvis furnaces, which were highly commended by those using them.

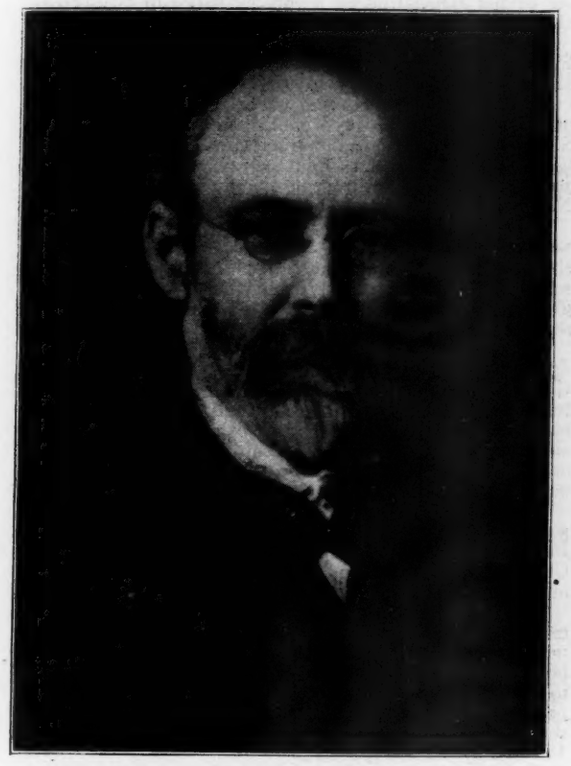
"Rates and rebates on electric lights by the year" was considered. Mr. R. J. Randolph, of Rockford, said in winter they ran 15½ hours in stores and dwellings. He ran three circuits, shutting down the lights at 7, 8 and 9 o'clock, and charging accordingly.

"The use of electricity as applied to motors" was discussed by Mr. Hovey. He thought the system had not gone beyond experimental points. To carry the current in high-tension form where it can be utilized was well worthy of consideration. The matter of motors had not gone beyond the experimental state. Scientific experts were not practical men, but they could overcome electrical disturbances by applying their theories to practice. Motors must be taken out of the laboratory. Someone must do it, and someone must lose money.

Mr. Van Depoele said electricity could be used for transmitting power. That much had been demonstrated.

The power of a motor could be governed in the same way that an engine is. The speed would always be the same whether the load was increased or decreased. Mr. Sperry said motors could be run, and that much had been settled beyond a doubt. They would be used the coming summer in driving fans. Mr. Curtis said that Cleveland was using street cars with motor appliances. Mr. Hockhausen, of New York, said in Europe motors were a great success. In New York they were used to drive fans and cool offices, and work elevators. They were put there to show the system more than to make money out of them. The only practical railway in the country where the motor worked successfully was the one in Cleveland.

Field's motor he knew nothing about, especially as to its power. There was talk of putting a Daft motor on the Brooklyn Bridge. Mr. Wadsworth saw one in Boston in full operation. President Morrison thought the power of a company ought not to be diverted to motor purposes as it might be required by their customers. Several held to the contrary, relying on the fact that all of the power purchased was not always in use.



**Edwin R. Weeks,**

First Vice-President of the National Electric Light Association.

A resolution offered by Mr. Hovey for the appointment of a committee of five to consider and report upon the organization of a National Electric Light Association was adopted. The chair appointed as such committee, Messrs. Hovey, Brown, Bowen, Bullock and Sperry.

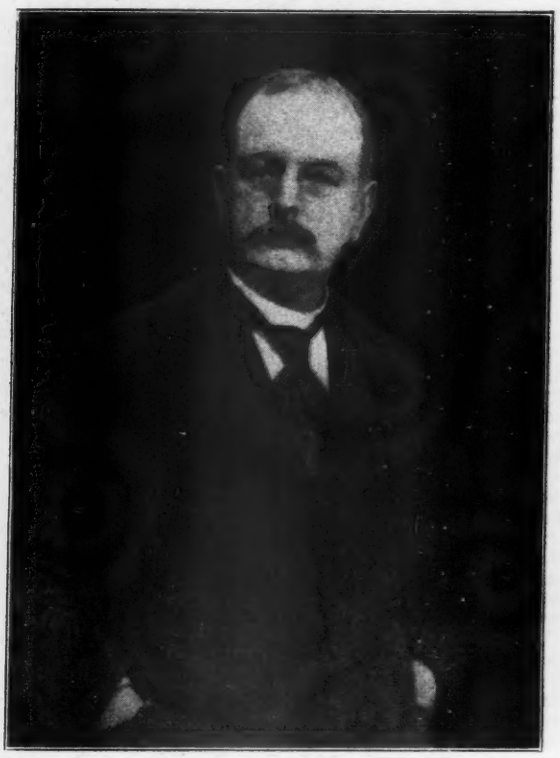
The next topic was, "Where an electric light system requires No. 6 conductors is it desirable to use Nos. 6 and 4 in the same line?" The question was decided in the affirmative. The convention adjourned at 11 p. m. to 10 a. m., Thursday.

THURSDAY'S SESSION.

The convention assembled at 10:20 a. m., and the regular program of addresses and brief discussions upon electrical subjects was then taken up, commencing with the consideration of "Special Insulation of Wires in Dangerous Places," the topic being opened by Mr. C. C. Haskins, the electric light inspector for Chicago. He described the proper standard of spaces to be observed between lines to obviate danger from friction and fire. In his judgment it was often safer to lay wires passing over woodwork close together rather than apart. The escape of electric current from one wire to another when at some distance apart, if continued long, resulted in scorching and charring the woodwork, and then there was always some very excellent kindling wood when a spark did come. On the contrary, when the wires were reasonably close together the current could pass from one to the other without charring the wood. Mr. Robinson, of Providence, spoke of his experience with wires gathering moisture in damp rooms, and Mr. Bell, of Minneapolis, and Mr. Place, of Chicago, spoke on the same topic.

The question whether frost would damage dynamos in transportation was answered in the negative by Mr. Van Depoele. Mr. Sperry agreed, but said the moisture from the thawing of the deposit of frost, if heavy, would be liable to be damaging.

"Incandescent Lighting and Length of Circuit" was considered, Mr. Sperry relating his experience in that line. Such lights, so far as the distance they could be worked, depended upon the resistance. Sir William Thompson's formula was the best one to be governed by. Mr. Wadsworth spoke of these lights in New York, where they were operated 4½ miles from the station. He did not know as to the economy of it. Mr. Ridlon said the same had been done in Boston. As to economy, he thought the gas companies might furnish the power. Mr. Van Depoele said automatic arrangements would have to be used. The best mode of propagating the light was the multiple arc system. Mr. Cleveland, of Hartford, said the length of the current required a central station, with substations 1 mile apart. This plan had been tried successfully by the Schuyler Electric Light Co., of Hartford, Conn. Mr. Place favored this plan and discussed the topic at some length.



**William A. Hovey,**

First Secretary-Treasurer of the National Electric Light Association.

"Street Lighting" was brought up, and Mr. Bowan said there were many different systems—towers and also lamps hanging at the intersections of the streets. Nashville employed the latter system, and the lamp was perfectly fixed. As regards the economy, more light was obtained from a group of lights placed on a tower. Where cities were compactly built, the alleys were lighted by this system. Six lights on a tower did as much lighting as 18 on poles. The city of Detroit had 90 towers and 350 lights, and it was handsomely lighted. Elgin was so lighted, and New Orleans, and the result was gratifying. It was the most economical way of lighting a city. The towers should not be too high. Mr. Weeks, of Kansas City, had found that the tower system gave dissatisfaction, especially where the streets

run at angles. In Detroit there was dissatisfaction, and they favored the pole system. Quincy adopted the latter plan, and the light was cheaper than gas. The best method was by poles at the intersection of streets. Mr. Fletcher, of Dayton, agreed with Mr. Weeks. Committees had visited the different cities and found the pole system more satisfactory than the tower. In Dayton the duplex lamp was used and water furnished the power. Mr. Randolph, of Rockford, said they had run lamps on wires stretched across the streets, and two lamps had fallen. He advocated the tower system, especially for small towns. It could not be done in Chicago, especially in the business portion of the city. Elgin, he said, was one of the best lighted cities in the United States, and every committee had so reported. Mr. Johnson, of Hyde Park, said that in Rockford, by its four lights on top of the Court House, every alley was lighted, and you could read a newspaper anywhere as if by a beautiful moonlight. He was converted to the tower system. Mr. Yarborough, of Nashville, said in his city posts were put up with arms to them, and during three years not a light had fallen. Mr. Montague, of La Crosse, Wis., said the wires across the street had been abandoned, and towers placed at the corner of the streets. The lamps were suspended on posts with iron arms and the system was satisfactory.

A recess for dinner was taken, a number of the members improving the opportunity by visiting the large establishments of the Western Electric and Van Depoele companies.

On reassembling, "Copper-Coated and Uncoated Carbons" was considered, George Wadsworth holding that copper-coated carbons were objectionable on the ground of obstruction to the lights and uncleanliness from the work of the trimmer. Mr. Van Depoele favored coated carbons where there was a low electric motive force and large current.

The committee appointed to consider the question of interference between electric light and telephone lines reported that the question was principally one of construction, wherein both sides had duties. The following was recommended: Telephone lines to have metallic circuits; return electric light circuit to be on the same poles as the outgoing circuit, when possible; care to keep the electric light carefully insulated and that all joints be soldered; electric light wires be suspended below the telephone wires; telephone companies use cable with induction killer and lightning arresters. The report was adopted.

The report of the Committee on Permanent Organization was then read by the chairman of the committee, Mr. William A. Hovey, of the ELECTRICAL REVIEW. It embodied a plan for a national association of those engaged in the business of manufacturing and operating the electric light in all parts of the country, and submitted a constitution and by-laws for such organization substantially as follows:

Article I.

The name of this association shall be the National Electric Light Association.

Article II.

The members of this association shall be companies, firms or individuals operating electric light plants or manufacturing electric light apparatus.

Article III.

Companies, individuals or firms engaged in the manufacture of machinery or apparatus connected with electric lighting may be admitted to associate membership by a vote of the Executive Committee. Such associate members shall pay the same dues as members, shall be entitled to seats at all meetings, but shall have no vote, shall be ineligible to office, and shall be entitled to the floor only at the request of the Executive Committee or presiding officer.

Article IV.

The officers of this association shall be a president, three vice-presidents, a secretary and treasurer, who shall be one and the same person, and six other members of the Executive Committee, of which the president, vice-presidents and secretary and treasurer shall be members *ex-officio*. Five members shall constitute a quorum. All officers shall be elected by ballot at any regular meeting of this association and shall hold their respective offices for one year, or until their successors are elected and qualified.

Article V.

The duties of the several officers shall be those usually pertaining to their offices.

Article VI.

The Executive Committee shall be the governing body of the association. It shall meet from time to time, gather and prepare information on all topics of interest, and submit reports at each meeting of the association.

Article VII.

At least one general meeting of the association shall be held each year, at such time and place as the Executive Committee shall determine.

Article VIII.

The entrance fee shall be $10 for each member. Each member may be represented by a number of delegates not exceeding three, and shall be entitled to one vote.

Article IX.

The constitution may be amended at any general meeting of the association by a vote by ballot of two-thirds of those present.

Officers of the association were elected as follows: President, J. F. Morrison, Baltimore; vice-presidents, H. M. Cleveland, Hartford; J. H. Yarborough, Nashville; E. R. Weeks, Kansas City; secretary and treasurer, William A. Hovey; executive committee, George S. Bowen, Chicago; William Hochhausen, New York; Gilbert Donaldson, St. Paul; Frank Ridlon, Boston; John R. Fletcher, Akron, O., and George O'Connor, New Orleans, and the officers above named.

The newly-elected officers of the national association were duly installed and President Morrison made a short address, thanking the convention for the honor of selecting him as their permanent chairman, and congratulating them upon the results of a useful, interesting and harmonious convention.

Mr. George S. Bowen delivered a short farewell address to the assembly, expressing the gratification of the Chicago Committee on Arrangements at the large attendance in response to the call and also upon the interest taken in the proceedings, closing with the expression of the hope that the "circuit of mutual sympathy and interest that had now been established would never be broken."

Resolutions thanking President Morrison for his impartial discharge of the duties of his position, the Grand Pacific Hotel for its many courtesies, and the press of Chicago for the full and correct reports, were adopted, and the convention adjourned *sine die*.

The Executive Committee held a meeting Thursday evening and decided to call a meeting some time in July next, the place to be decided hereafter. Circulars will be sent to all members, asking their views on the topics to be discussed and the place preferred for holding the next meeting. The members quite generally favored the East, and New York, Saratoga, Atlantic City and Put-in-Bay were suggested.

The full stenographic report of the proceedings is in the hands of the secretary, to be published in pamphlet form and a copy sent to each member.

THE ROSTER.

Those recording their names are given below, although there were a number of gentlemen coming in the last day who failed to place their names on the roll:

NAMES OF ATTENDANTS—FEBRUARY CONVENTION, 1885.

Adams, H. C., Holmes, Booth & Haydens, New York City.
Angell, T. H., American Electric Works, Providence, R. I.
Askew, C. B., St. Paul Electric Works, St. Paul, Minn.
Avery, Albert L., Buffalo Electric Works, Buffalo, N. Y.
Badger, S. S., Badger Electric Light Co., Chicago, Ill.
Bailey, Theo. P., Chicago, Ill.
Baldwin, Sommerfield, Brush Electric Co., Baltimore, Md.
Beach, Wm. H., Olmstead Electric Light Co., Minneapolis, Minn.
Barton, E. M., Western Electric Co., Chicago.
Bell, Vernon, Western Electric Co., Minneapolis, Minn.
Boulton, W. H., Boulton Carbon Co., Cleveland, Ohio.
Bowen, Geo. S., Elgin Electric Light Co., Elgin, Ill.
Brintnell, H. L., Swift Electric Light Co., Saginaw, Mich.
Brown, Chas. A., Western Electric Co., Chicago.
Brown, Harold P., Chicago, Ill.
Buckley, W. J., Excelsior Electric Light Co., Chicago, Ill.
Bullock, M. C., Brush Electric Light Co., Chicago, Ill.
Burgett, H. W., American Electric & Illuminating Co., Boston, Mass.
Bush, W. L., Van Depoele Co., Chicago.
Carter, Geo. W., Van Depoele Co., Jackson, Mich.
Cleveland, H. M., Schuyler Electric Light Co., Hartford, Conn.
Cotter, C. A., Ansonia Brass & Copper Co., Chicago.
Crossman, Geo. L., Thomson-Houston Electric Light Co.
Curtis, C. C., Brush Company, Cleveland, Ohio.
Donaldson, Gilbert, Electric Light Co., St. Paul, Minn.
Fletcher, Geo. D., Van Depoele Co., Dixon, Ill.
Fletcher, J. R., Dayton Electric Light Co., Dayton, Ohio.

Fleisheim, Joseph, Electric Light Co., Menominee, Mich.
Fox, E. M., E. Remington & Sons, Ilion, N. Y.
French, Chas. E., Cleveland Carbon Co., Cleveland, Ohio.
Fyfe, John C., Nee Bau Electric Light Co., Chicago, Ill.
Fishback, L. M., Parker-Russell Mfg. Co., St. Louis, Mo.
Goldthwaite, W. M., Electric Light Co., La Porte, Ind.
Goldthwaite, W. M., Electric Light Co., Adrian, Mich.
Gray, Elisha, Chicago.
Hammett, W. A., New York Safety Steam Power Co., Chicago, Ill.
Haskins, C. C., Western Electric Co., Chicago.
Hathaway, W. P., Fuller Electric Light Co., Milwaukee, Wis.
Hochausen, W., New York.
Hovey, Wm. A., ELECTRICAL REVIEW, New York, N. Y.
Ide, A. L., Springfield, Ill.
Jacobus, D., Van Depoele Co., Crookston, Minn.
Johnson, R. M., Hyde Park, Ill.
Keasel, W. H., Willoughby, Hill & Co., Chicago.
Keim, E. T., United States Electric Light & Power Co., Dubuque, Iowa.
Knapp, W. A., Railway Telegraph Supply Company, Chicago.
Kreidler, W. A., Chicago.
Lane, A. N., Muskegon, Iowa.
Lewis, W. T., Thomson-Houston Co., Racine, Wis.
Libbey, E. D., New England Glass Co., Boston.
Locke, S. E., Schuyler Electric Light Co., Omaha, Neb.
Mills, F. M., Thomson-Houston Co., Des Moines, Iowa.
Montague, E. R., Brush Co., La Crosse, Wis.
Morrison, J. F., Brush Electric Co., Baltimore, Md.
McDonald, R. L., Jenney Electric Co., Ft. Wayne, Ind.
McDonald, R. T., Jenney Electric Co., Ft. Wayne, Ind.
McLaughlin, A. W., Holmes, Booth & Hayden, New York.
Neville, J. C., Manufacturing Electric Light Crossarms, South Bend, Ind.
O'Beirne, E. J., Star Iron Tower Co., Ft. Wayne, Ind.
Palmer, E. B., Sperry Electric Light Co., Chicago.
Parker, G. W., Parker-Russell Mfg. Co., St. Louis, Mo.
Place, Edwin, Sperry Electric Light Co., Chicago.
Plumridge, T. P., American Carbon Co., Chicago.
Powers, W. T., Grand Rapids Electric Light Co., Grand Rapids, Mich.
Price, Chas. W., ELECTRICAL REVIEW, Chicago.
Randolph, R. J., Rockford, Ill.
Reid, J. H., Electrical Supply Co., Chicago.
Richards, C. J., Racine, Wis.
Ridlon, Frank, Brush Electric Co., Boston, Mass.
Robinson, R. T., Providence, R. I.
Robinson, J. D., New England Glass Co., Chicago.
Russell, D. R., Parker-Russell Mfg. Co., St. Louis, Mo.
Simpson, J. D., Chicago.
Slack, L. W., Pittsburgh Carbon Co., Pittsburgh, Pa.
Sperry, Elmer A., Sperry Electric Light Co., Chicago.
Stanley, H. D., Bridgeport Electric Light Co., Bridgeport, Conn.
Stanwood, J. H., Badger Electric Light Co., Chicago.
Stewart, Frank, Western Electric Co., Chicago.
Stiles, Aaron K., Van Depoele Co., Chicago.
Terry, F. S., Electrical Supply Co., Chicago.
Van Depoele, C. J., Van Depoele Co., Chicago.
Wadsworth, Geo. H., Boulton Carbon Co., Cleveland, Ohio.
Walworth, W. T., Manufacturing Electric Light Crossarms, South Bend, Ind.
Warren, C. C., United States Electric Light Co., Chicago.
Webster, C. H., Chicago.
Weeks, E. R., Thomson-Houston Electric Light Co., Kansas City, Mo.
Yarborough, J. H., Nashville, Tenn.
Young, John, Western Electric Co., Chicago.

It is interesting at this time to dwell a little longer on the attitude of mind of the central-station men when the first convention of the National Electric Light Association was called to order.

From the official proceedings we find that first of all it was decided to leave out of consideration and discussion the relative merits of different lamps. It was pointed out that the electrical apparatus was not the only factor to success. One speaker indicated that there was a certain company using a certain system which was succeeding in making money, giving good light, increasing its business and giving satisfaction to its customers. There was another company using precisely the same system, which was giving a poor light, losing money, losing business and being overcome by the opposition.

It appeared that in 1885 there were grave doubts on the part of those interested in an electric light and power enterprise of the profitableness of their undertakings.

Mr. Bowen upon accepting the temporary chairmanship, stated that the electric light men had just passed through a year of most trying difficulties, which he hoped they would never see again.

There was quite a tangle over the appointment of committees. Mr. Bowen was not familiar or well acquainted with a great many of those in attendance, and in fact there was not the clearest idea as to whether the purely practical or scientific and academic aspects of the industry should be given prominence.

There was a very active discussion on the relative merits of the telephone and telegraph systems. It seems that in those early days the telephone man regarded the electric light man as his natural enemy, because the telephone man had not yet learned to protect his circuits and the electric light man apparently did not think that he should.

It is refreshing to read of the position which Mr. Vail, then general manager of the Bell Telephone Co., took with respect to this matter. When Mr. Hovey was president of the Electric Light Co. in Boston he visited Mr. Vail at telephone headquarters, and the latter said to him: "The Electric Light and Bell Telephone companies have come to stay and they are going to stay, and you might say we are either going to stand together or fall together, except that the latter is not the fact. We are going to stand together and help each other." Thus, at a time when a false attitude might have retarded to a great extent the development of both of these industries, the policy of the man who today wields the greatest influence in telephone and telegraph circles laid down the fundamental principle which has worked unto success.

The subject of rates and the extent to which the electric light men could compare notes on the cost of operation gave the pioneers a good deal of concern. So strong was the objection on the part of several of those present to the making public of cost information that upon the vote of the convention the appointment of a committee to secure cost data was annulled.

In accepting the presidency of the association, Mr. Morrison said that the organization would enable the central-station men to stand shoulder to shoulder to defend their rights. It would give them an opportunity of communication between each other which they should have had long before. He advocated another meeting in at least six months, and adjured those present to hold to strict account their engineers and superintendents that they might furnish every bit of information possible to be communicated to the organization.

# History of the Association Subsequent to First Convention

The conventions which followed were held semi-annually for about 8 years until 1892 and annually thereafter. The complete roster of officers elected at the first convention are given in a preceding column and the following comprises the complete list of presidents of the association to date with the names of the cities where the conventions were held. The association this year goes back to Chicago—the city of its birth.

| Conventions of the Association. No. | | Presidents of the Association. |
|---|---|---|
| 1 | Chicago, Feb. 25-26, 1885 | James F. Morrison |
| 2 | New York, Aug. 18-20, 1885 | James F. Morrison |
| 3 | Baltimore, Feb. 10-12, 1886 | James F. Morrison |
| 4 | Detroit, Aug. 31-Sept. 2, 1886 | James F. Morrison |
| 5 | Philadelphia, Feb. 15-17, 1887 | James F. Morrison |
| 6 | Boston, Aug. 9-11, 1887 | James F. Morrison |
| 7 | Pittsburgh, Feb. 21-23, 1888 | James F. Morrison |
| 8 | New York, Aug. 29-31, 1888 | Samuel A. Duncan |
| 9 | Chicago, Feb. 19-21, 1889 | Samuel A. Duncan |
| 10 | Niagara Falls, Aug. 6-8, 1889 | Edwin R. Weeks |
| 11 | Kansas City, Feb. 11-14, 1890 | Edwin R. Weeks |
| 12 | Cape May, Aug. 19-21, 1890 | Marsden J. Perry |
| 13 | Providence, Feb. 17-19, 1891 | Marsden J. Perry |
| 14 | Montreal, Sept. 7-10, 1891 | Charles R. Huntley |
| 15 | Buffalo, Feb. 23-25, 1892 | Charles R. Huntley |
| 16 | St. Louis, Feb. 28-Mar. 2, 1893 | James I. Ayer |
| 17 | Washington, Feb. 27-Mar. 2, 1894 | Edw. A. Armstrong |
| 18 | Cleveland, Feb. 19-21, 1895 | M. Judson Francisco |
| 19 | New York, May 5-9, 1896 | C. H. Wilmerding |
| 20 | Niagara Falls, June 8-10, 1897 | Frederic Nicholls |
| 21 | Chicago, June 7-9, 1898 | Samuel Insull |
| 22 | New York, May 23-25, 1899 | Alden M. Young |
| 23 | Chicago, May 22-24, 1900 | Samuel T. Carnes |
| 24 | Niagara Falls, May 21-23, 1901 | James Blake Cahoon |
| 25 | Cincinnati, May 20-22, 1902 | Henry L. Doherty |
| 26 | Chicago, May 26-28, 1903 | Louis A. Ferguson |
| 27 | Boston, May 24-26, 1904 | Charles L. Edgar |

28 Denver-Colorado Springs, June 6-11, 1905.....Ernest H. Davis
29 Atlantic City, June 5-8, 1906...William H. Blood, Jr.
30 Washington, June 4-8, 1907...Arthur Williams
31 Chicago, May 19-22, 1908.....Dudley Farrand
32 Atlantic City, June 1-4, 1909...William C. L. Eglin
33 St. Louis, May 23-27, 1910....Frank W. Frueauff
34 New York, May 29-June 2, 1911.....W. W. Freeman
35 Seattle, June 10-14, 1912.....John F. Gilchrist
36 Chicago, June 2-6, 1913.....Frank M. Tait
37 Philadelphia, June 1-5, 1914...Joseph B. McCall
38 San Francisco, June 7-11, 1915. Holton H. Scott
39 Chicago, May 22-26, 1916.....E. W. Lloyd
40 New York, May 9-10, 1917....Herbert A. Wagner
41 Atlantic City, June 13-14, 1918. John W. Lieb
42 Atlantic City, May 19-22, 1919. Walter F. Wells
43 Pasadena, May 18-22, 1920....R. H. Ballard
44 Chicago, May 31, June 3, 1921. Martin J. Insull

The presiding officer at each convention (except at the first) was elected at the close of the preceding convention which is the custom today.

The complete roster of officers of the present year is as follows:

NATIONAL EXECUTIVE COMMITTEE, 1920-1921.
OFFICERS.

President, Martin J. Insull, Middle West Utilities Co., Chicago.
First Vice-President, M. R. Bump, Henry L. Doherty & Co., New York.
Second Vice-President, Frank W. Smith, The United Electric Light & Power Co., New York.
Third Vice-President, Walter H. Johnson, The Philadelphia Electric Co., Philadelphia.
Fourth Vice-President, Frank T. Griffith, Portland Railway, Light & Power Co., Portland, Ore.
Treasurer, H. C. Abell, American Light & Traction Co., New York.
Executive Manager, M. H. Aylesworth, N. E. L. A. Headquarters, 29 West 39th Street, New York.

**Convention Group of Officials and Delegates, St. Louis Convention, 1910, Including F. W. Frueauff, Henry L. Doherty, W. W. Freeman, F. M. Tait, T. C. Martin and Charles W. Price.**

**R. H. Ballard, President, N. E. L. A., 1919-20.**

MEMBERS AT LARGE.

W. H. Atkins, The Edison Electric Illuminating Co. of Boston.
R. H. Ballard, Southern California Edison Co., Los Angeles, Cal.
E. M. Herr, Westinghouse Electric & Manufacturing Co., Pittsburgh.
W. A. Layman, Wagner Electric Manufacturing Co., St. Louis.
E. W. Lloyd, Commonwealth Edison Co., Chicago.
D. H. McDougall, Toronto Power Co., Toronto, Can.
Walter Neumuller, The New York Edison Co., New York.
J. F. Owens, Oklahoma Gas & Electric Co., Oklahoma City, Okla.
E. W. Rice, General Electric Co., Schenectady, N. Y.
Paul Spencer, United Gas Improvement Co., Philadelphia.

NATIONAL SECTION CHAIRMEN.

J. C. Van Duyne, Accounting Section, Brooklyn Edison Co., Inc., Brooklyn.
M. S. Seelman, Jr., Commercial Section, Brooklyn Edison Co., Inc., Brooklyn.
J. E. Davidson, Public Relations Section, Nebraska Power Co., Omaha.
I. E. Moultrop, Technical Section, The Edison Electric Illuminating Co. of Boston.

GEOGRAPHIC DIVISION PRESIDENTS.

A. Monro Grier, Canadian, Canadian Niagara Power Co., Niagara Falls, Ont., Can.
Eastern. (This division is in process of formation.)
East Central. (This division is in process of formation.)
W. C. Lounsbury, Great Lakes, Superior Water, Light & Power Co., Superior, Wis.
Middle Atlantic. (This division is in process of formation.)
O. H. Simonds, Middle West, Dubuque Electric Co., Dubuque, Ia.
Bowen Tufts, New England, C. D. Parker & Co., Boston.
T. D. Crocker, North Central, Minneapolis General Electric Co., Minneapolis.
F. T. Griffith, Northwest, Portland Railway, Light & Power Co., Portland, Ore.
L. H. Newbert, Pacific Coast, Pacific Gas & Electric Co., San Francisco.
E. A. Phinney, Rocky Mountain, The Jefferson County Power & Light Co., Golden, Colo.
S. B. Irelan, Southeastern, Montgomery Light & Water Co., Montgomery, Ala.
A. Hardgrave, Southwestern, American Public Service Co., Dallas, Tex.

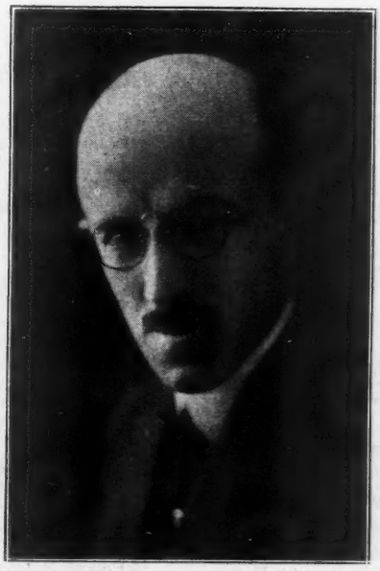
# Central-Station Companies Launch Good-Will Campaign

## Manufacturers' Committee of National Electric Light Association Plans Co-operation With Other Branches of Electrical Industry in Educating Public to Needs of Utilities

By PHILIP L. THOMSON

**This publication has been desirous of placing before its readers the story of the co-operative good-will advertising campaign in behalf of public utilities which is now attracting so much attention in the electrical industry. Philip L. Thomson, advertising manager of the Western Electric Co., the author of this article, is chairman of the manufacturers' committee of the National Electric Light Association, which is charged with this work. It will be remembered that it was the Western Electric Co. that inaugurated this form of advertising in its 1920 campaign in behalf of public utilities in general, and of the electrical industry in particular.**

The ELECTRICAL REVIEW has already had much to say of the constructive program for better public relations which is a conspicuous part of the 1920-21 program of the National Electric Light Association. In some respects the most significant aspect of that program is the manner in which all departments of the industry, outside of the central-station companies themselves, are sharing in the movement.



Philip L. Thomson.

It is significant of the progress which electrical people have made during the past few years that all branches of the industry can meet on common ground and put over collectively a big co-operative program involving the expenditure of hundreds of thousands of dollars and a vast amount of personal effort. It is a mark of progress because it proves that the electrical industry has grown broad enough to see how dependent each branch is upon the prosperity of the rest, and to back up that belief, if need be, by spending our own good money and our own time for the immediate purpose of helping that branch of the industry most in need of assistance, with the expectation that in the future this investment may benefit each of us as it benefits the business as a whole.

Early last fall a group of manufacturers' representatives was called together by the Public Relations Committee of the National Electric Light Association and we were told that our central-station friends would like to have us help in their good-will campaign. It was pointed out to the manufacturers at this meeting that they were spending large sums of money to popularize their own products and to popularize and encourage the further use of electricity at a time when a good proportion of the central-station companies in the country were already embarrassed because of their inability to handle more business. Here was one great arm of the industry pounding away with a message of "Do It Electrically" when the service end of the business, with much of its reserve plant used up, was not only not soliciting for more business but was of necessity declining much that was being offered.

The manufacturers were told the now familiar story of the "Self Interest" program as developed by the San Joaquin Power & Light Co. in California. So long as the operating company had rates which were not earning a satisfactory return, it was unable to attract the new capital necessary for its extensions and the extensions were not made, thus holding back a normal development of house wiring for the contractor, generating equipment and outside construction for the manufacturer and jobber, and motor and device sales for the dealer, not to mention the new construction in fields outside of the electrical, dependent upon the utilities proceeding with their normal development.

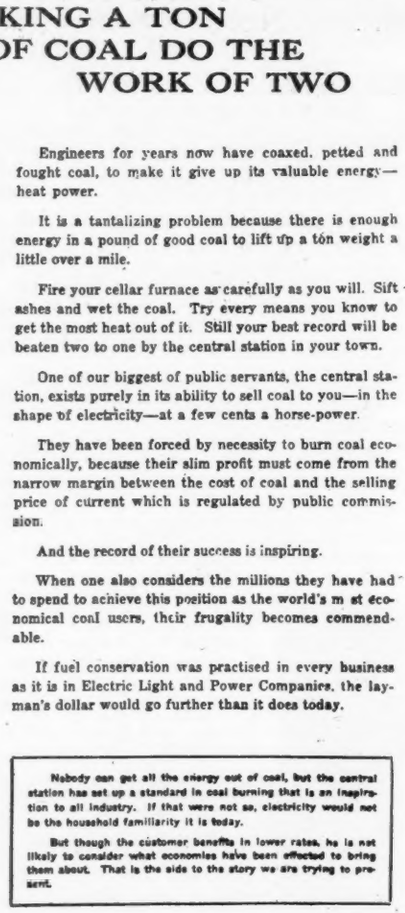
Various forms of co-operation were discussed and dismissed, among them the proposal for a fund to be contributed by manufacturers and expended in a series of advertisements in behalf of the utilities, to be signed by the manufacturers' committee. Another plan was the "familiar slogan" idea under which every advertiser would be asked to introduce into his copy, with frequent repetition, a uniform slogan telling the public and the trade in effect, to back up central-station companies of the country.

The plan finally agreed upon was to ask advertisers to devote at least one piece of copy and, if possible, one-twelfth of their 1921 appropriation to a straight-out appeal upon one phase or another of the electric light and power companies' needs. It was felt that this plan would enable advertisers to tell in their own way, and over

their own signatures. what they would like to have their readers think about or do for the electric light companies.

COMPREHENSIVE PLAN OF CO-OPERATIVE ADVERTISING CAMPAIGN OUTLINED.

In October this plan was placed before the manufacturers of electrical products and immediately it met with a hearty response. Offers of



**MAKING A TON OF COAL DO THE WORK OF TWO**

Engineers for years now have coaxed, petted and fought coal, to make it give up its valuable energy—heat power.

It is a tantalizing problem because there is enough energy in a pound of good coal to lift up a ton weight a little over a mile.

Fire your cellar furnace as carefully as you will. Sift ashes and wet the coal. Try every means you know to get the most heat out of it. Still your best record will be beaten two to one by the central station in your town.

One of our biggest of public servants, the central station, exists purely in its ability to sell coal to you—in the shape of electricity—at a few cents a horse-power.

They have been forced by necessity to burn coal economically, because their slim profit must come from the narrow margin between the cost of coal and the selling price of current which is regulated by public commission.

And the record of their success is inspiring.

When one also considers the millions they have had to spend to achieve this position as the world's most economical coal users, their frugality becomes commendable.

If fuel conservation was practised in every business as it is in Electric Light and Power Companies, the layman's dollar would go further than it does today.

Nobody can get all the energy out of coal, but the central station has set up a standard in coal burning that is an inspiration to all industry. If that were not so, electricity would not be the household familiarity it is today.

But though the customer benefits in lower rates, he is not likely to consider what economies have been effected to bring them about. That is the side to the story we are trying to present.

**PEOPLES LIGHT CO.**

Through Courtesy of Western Electric Company.

**One of the Good-Will Advertisements Inserted in the Davenport (Ia.) Democrat.**

space came, not alone from the larger manufacturers, but from many who had hitherto not found a method of identifying themselves in any tangible way as well wishers for the central stations. The schedule of advertising in the trade press began in December, even before the movement was expected to start. The early replies to the committee's invitation developed a definite need for assistance from N. E. L. A. headquarters in the preparation of the proposed advertisements. Facts, figures and central-station policy data were required as a background for the various pieces of copy and in this emergency the publicity department sought and secured valuable assistance from the editorial staffs of the *Electrical World* and the ELECTRICAL REVIEW, both of whom generously loaned the services of representatives to aid in the preparation of copy.

At the same time offers of editorial and advertising co-operation in the movement came from other publications in the field. Notable among these is the *Electric Journal*, which has notified all of its regular advertisers using six or more pages annually, that for each six pages the publisher will donate an additional page with the understanding that it is to be devoted to N. E. L. A. good-will copy appearing over the advertiser's signature. On the basis of advertisers using six and 12 pages annually, this donation of valuable space will mean an excess of 60 pages of good-will copy during the year in a single publication.

At headquarters of the National Electric Light Association offers of additional space are being received almost daily and assistance is being rendered manufacturers and advertising agencies so as to synchronize the individual advertisements with the fundamental policies of the association and to carry a consistent schedule of publicity throughout the year.

At this time the following concerns have agreed to devote a part of their national publicity to this central-station good-will advertising:

| COMPANY. | NATIONAL MAGAZINE. |
|---|---|
| General Electric Co. | Saturday Evening Post |
| Westinghouse Elec. & Mfg. Co. | Saturday Evening Post, Literary Digest |
| Western Electric Co. | Literary Digest, Colliers |
| Wagner Electric Mfg. Co. | Literary Digest |
| Mazda Research Laboratories | American Magazine |
| McGraw-Hill Publishing Co. | Collier's |

NEWSPAPERS.

| | |
|---|---|
| Robbins & Myers | In 23 principal cities |
| McGraw-Hill Publishing Co. | In 20 principal cities |

MAGAZINES AND DATES NOT YET DESIGNATED.

American Electrical Heater Co.
Edison Electric Appliance Co.
Habirshaw Electric Cable Co.
The Duplexalite Co.

The following companies have agreed to use space in trade and technical papers:

Trumbull Electric Manufacturing Co., Plainville, Conn.
Hygrade Lamp Co., Salem, Mass.
Condit Electrical Manufacturing Co., South Boston, Mass.
Kuhlman Electric Co., Bay City, Mich.
Burke Electric Co., Erie, Pa.
Electric Storage Battery Co., Philadelphia.
Majestic Electric Development Co., Philadelphia.
Locomotive Electric Washing Machine Co., Belleville, Ill.
ELECTRICAL REVIEW, Chicago.
Federal Electric Co., Chicago.
Sangamo Electric Co., Springfield, Ill.
Moloney Electric Co., St. Louis.
Roller-Smith Co., New York City.
Power Specialty Co., New York City.
Westinghouse Lamp Co., New York City.
Packard Electric Co., Warren, O.
Canadian Westinghouse Co., Ltd., Hamilton, Ont.
Hamilton-Beach Manufacturing Co., Racine, Wis.
Syracuse Washing Machine Corp., Syracuse, N. Y.
Britton & Doyle, Cleveland.
Jeffery-Dewitt Insulator Co., Huntington, W. Va.
The P. A. Geier Co., Cleveland.
Anaconda Copper Mining Co., Chicago.
Domestic Electric Co., Cleveland.
*Electrical World*, New York City.
Beardslee Chandelier Manufacturing Co., Chicago.
*Electrical Record*, New York City.
*The Electrical Journal*, Pittsburgh.
Hurley Machine Co., Chicago.
H. W. Johns-Manville Co., New York City.

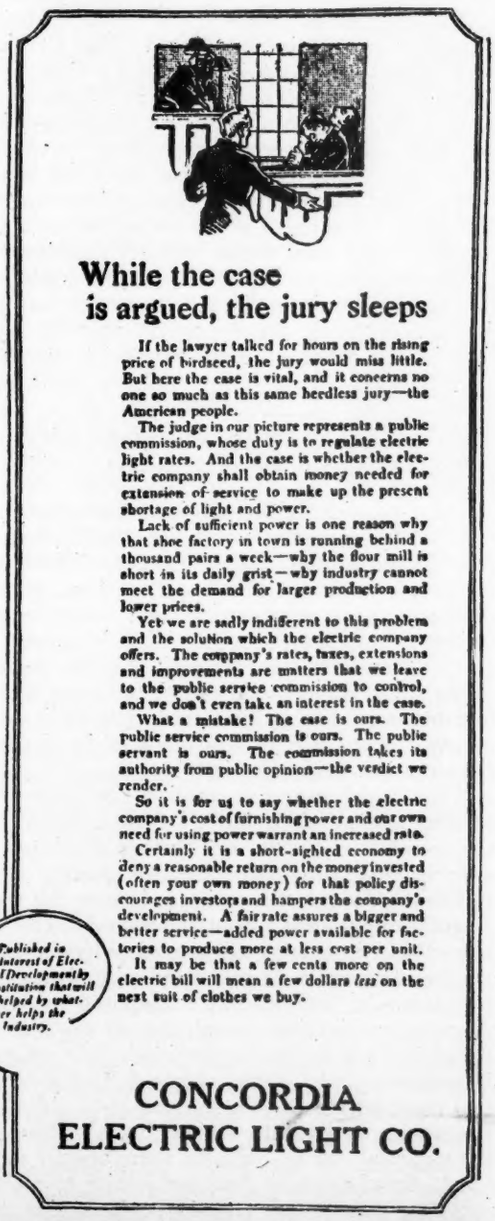
Another means of publicity to be utilized is the manufacturers' house organ, both that of the sales type circulating among the trade and the

employes' types of magazine circulating through the factories. Several manufacturers have already agreed to run a series of articles explaining to their people the true economics of central-station situation in order that these employes of electric manufacturers—most of whom are presumably customers of the utilities—may be predisposed to a friendly rather than an antagonistic attitude.

### Extending Good-Will Campaign to Include Employes and Friends.

Within the circle of his neighbors and personal friends a shopman in the electric works or the vacuum cleaner factory is assumed to be familiar with the electric business, and when these neighbors gather to discuss electric light rates or streetcar fares the man in the electrical business is looked to as one whose opinion carries a certain amount of authority. There are hundreds of thousands of such men who are earning their livelihood in the electrical manufacturing field and yet no effort has heretofore been made to win them over to a sympathetic understanding of the utility and its problems. Every one of these men ought to be a friend of the lighting company and street railway and telephone companies in his town.

Still another form of co-operation from manufacturers has been inaugurated by the Edison Electric Appliance Co., which will insert in its package-goods cartons, slogans bearing upon central-station service which will be read when the purchaser of the product opens the package.


While the case is argued, the jury sleeps
If the lawyer talked for hours on the rising price of birdseed, the jury would miss little. But here the case is vital, and it concerns no one so much as this same heedless jury—the American people.
The judge in our picture represents a public commission, whose duty is to regulate electric light rates. And the case is whether the electric company shall obtain money needed for extension of service to make up the present shortage of light and power.
Lack of sufficient power is one reason why that shoe factory in town is running behind a thousand pairs a week—why the flour mill is short in its daily grist—why industry cannot meet the demand for larger production and lower prices.
Yet we are sadly indifferent to this problem and the solution which the electric company offers. The company's rates, taxes, extensions and improvements are matters that we leave to the public service commission to control, and we don't even take an interest in the case.
What a mistake! The case is ours. The public service commission is ours. The public servant is ours. The commission takes its authority from public opinion—the verdict we render.
So it is for us to say whether the electric company's cost of furnishing power and our own need for using power warrant an increased rate.
Certainly it is a short-sighted economy to deny a reasonable return on the money invested (often your own money) for that policy discourages investors and hampers the company's development. A fair rate assures a bigger and better service—added power available for factories to produce more at less cost per unit.
It may be that a few cents more on the electric bill will mean a few dollars less on the next suit of clothes we buy.
Published in the interest of Electrical Development by an Institution that will be helped by whatever helps the Industry.
CONCORDIA ELECTRIC LIGHT CO.

Clipping From the Concordia (Kans.) Blade-Empire.

The Electrical Industry
THE CENTRAL STATION
The Electrical Industry
Keep the Keystone in Place
Keep this Incident in Mind
Here is a little news item clipped from the "News Service Bulletin" 4/12/20. It carries with it some real food for present day thought
"CLINTON, KY.—This city of 2500 population in Western Kentucky is without water and electric light, after enjoying these utilities for more than 20 years. The people are using kerosene lamps, carrying lanterns at night and carrying water from nearby springs and wells.
The local company was unable to cope with the increased cost of coal, labor and operating supplies and had to shut down the plant. The city then undertook to operate the property, but found it too expensive and closed down. The local Commercial Club has raised $10,000 which will be offered as a bonus to anyone who will purchase and operate the plants. Business men say that real estate has depreciated very much in value and that people are leaving for places that can afford substantial utility service."
The next time you hear anyone knocking the lighting company in your locality tell them this little story. It will serve to gain a higher appreciation of electric service by the public—something that is badly needed now for the good of the whole industry
Don't you want to help?
Carry on the good word.
THE ELECTRIC STORAGE BATTERY CO.
Oldest and largest manufacturers in the world of Storage Batteries for every purpose
1888 PHILADELPHIA 1920
Branches in seventeen cities
Special Canadian Representatives: Chas. E. Goad Engineering Co., Limited Toronto and Montreal

Good-Will Advertisement Used in South Bend (Ind.) News-Times.

### Enlisting the Co-operation of the Central-Station Companies.

The plan of the National Electric Light Association's publicity department, of sending out to its central-station members once a month preprints of advertisements to appear during the ensuing 30 or 60 days, gives a double value to every manufacturer who is thus co-operating. G. F. Oxley, director of publicity, is suggesting in these letters that central-station companies so far as possible embody the thoughts contained in these advertisements of manufacturers in their own local newspaper advertising, reprinting the advertisement in whole or in part "by permission of" the manufacturer and the magazine in which it appears. Such a reprinting of manufacturers' national advertising in local newspapers has a double benefit. In the first place it is that much extra circulation for the manufacturer and in the second place it constitutes for the central station a novel form of publicity—a pleading of its case to its own customers by a "next friend" to some extent at least that of a disinterested outsider.

One result of this readiness of the manufacturers to devote part of their advertising appro-

priations for the benefit of central-station companies has been to awaken in the minds of the latter the necessity for their doing something collectively on their own account. We are to see in 1921, therefore, the manufacturers' efforts matched by a campaign financed by the central-station companies themselves, and running in the *Saturday Evening Post* for a total of 13 half-page spaces, in which the public is taken into the confidence of the central-station industry and is told of the problems incident to its successful management, and of the relation which the public bears to its prosperity and ability to develop. These advertisements, signed in the name of the National Electric Light Association, will tell a story hitherto too little known by the public.

For many years our central-station companies have been criticized for their silence. One after another of them has been the subject of attack by local politicians or others who had fancied grievances, and too often the public utility so attacked has been content to try the issue in the courts of law without any resort to the greatest court of all—public opinion.

When M. H. Aylesworth, executive manager of the National Electric Light Association, addressed the National Association of Public Utility Commissioners at Washington last fall and told them of the steps which were being taken by the N. E. L. A. to inform the public of the true economics of their industry, his proposal met with unanimous approval at the commissioners' hands.

PLAN HAS APPROVAL OF PUBLIC UTILITY COMMISSIONERS' ASSOCIATION.

"The public," explained one of the commissioners, "has so long been kept in ignorance of the facts in the case that they have been all too ready to believe the accusations against the utilities of watered stock, mismanagement, excessive rates, etc. This condition has been so general that many an office seeker looking for a platform has found that the easiest way to get votes was to attack the public utilities. Now if you utilities agree upon the necessity of intelligent publicity and will get your industry back of you so that everybody may know the facts, no one can take exception to reasonable increases in rates when they are justified by those facts, and the work of the public utility commissioners in ruling upon applications for changes in rates will, as a matter of fact, be much easier because their decisions will be backed by an intelligent public."

It would seem, therefore, that from every angle—the public, the utility, the manufacturer, jobber, contractor and retailer—unmistakable benefits are bound to follow the inauguration of this good-will movement. The great problem of the industry is a problem of better public relations. Billions of capital are required to finance the necessary development of the electrical facilities of the country. This money must come from the investing public. To attract the investor the industry must show a satisfactory return upon capital already invested, and evidence of the ability to maintain a satisfactory return upon the additional capital desired.

The management of our great utilities can to some extent control operating costs but if the selling price of their service is controlled by governmental, state or municipal regulatory bodies, the rates at which the utilities' service is to be sold will be regulated by these commissions, and most utility men are agreed that such regulation is entirely proper. These regulating commissions are, therefore, the servants of the public, and by and large they will carry out the public's will.

It is certainly gratifying, therefore, at this time that the business as a whole is united in this work of educating the public and building for a lasting good will, but the task is one of no mean proportion. It is one that challenges the interest and support of every man and of every organization in any way connected with the electrical industry.

## WIRELESS STATION INSTALLATIONS IN VENEZUELA.

A definite program has been established by the Venezuelan government for the installation of 22 secondary wireless stations. Contracts have already been awarded to an American citizen for installing wireless towers at the following points: Maracay (installation completed), San Cristobal, Maracaibo, Puerto Cabello, Coro, La Guaira, and Ciudad Bolivar. The station at Maracay has been equipped with a 5-kw. set purchased from an American concern, and orders have been placed with American concerns for three other 5 and one 3.5-kw. set. The type of instrument to be used at Coro and La Guaira will probably not be determined until about July 1. Consideration of the proposal to install a central wireless station to communicate with the exterior has been deferred pending an expected material reduction in the price of steel and other necessary commodities.

## FIXING OF RATES BY STATE UTILITIES COMMISSION.

Some candidates for public favors recently attempted to leave the impression that if the state public utilities commission were abolished, they, if elected, would go ahead and fix rates for electricity, gas, transportation and telephones at whatever rate they saw fit. That is entirely untrue. Even were local authorities given power of fixing rates, these would not be final and in every instance would be subject to review by impartial courts. The *Chicago Daily News,* in discussing the situation, said editorially:

"The legislature can abolish the state public utilities commission, but of course abolition of the commission would not restore absolute home rule in regulating the rates of charges of the utilities. To assert that is to deceive the public. Regulation by local authorities would not be final, but subject in every case to review by the courts, state and federal. A rate fixed without regard to the facts—a 'political rate' imposed without a proper investigation—would be set aside as confiscatory if it failed to provide a fair return on invested capital. Rates charged by public utilities must be reasonable and just, not alone from the consumer's point of view, but also from that of impartial courts. Where there are no state or local commissions to deal out justice to all interests, the courts may and do perform this necessary function."

# Electrical Progress Measured by N. E. L. A. Activities

## Forty-fourth Convention of the National Electric Light Association, at Chicago, May 31, Will Disclose Results of Concentrated Efforts Being Put Forth by Entire Electrical Industry

By M. H. AYLESWORTH

*Executive Manager, National Electric Light Association.*

On May 31 there will congregate in the convention hall, Hotel Drake, Chicago, several thousand representatives of the electrical industry who will be in attendance at the 44th convention of the National Electric Light Association. Great are the problems which electricity must solve, and many of these important questions will be presented, discussed and solved at this convention. For in this busy year, business, industry and the individual have been forced to quickly meet the changed conditions. It is quite natural that the electrical industry should be harmoniously carrying on in leading the great industrial parade of national development.

M. H. Aylesworth.

Assembled at this convention, and meeting with the electric light and power representatives, will be found the electrical manufacturer, the contractor-dealer and the jobber, listening to and discussing with the leading bankers of the nation, public officials, engineers, and students of electrical development, those practical problems which the industry must meet, and meet in a short period of time. Finance, regulation, service, water power, fuel, public policy, technical and commercial development—all of these subjects, which are so closely interwoven, will be presented.

### Members Appreciate Value of Concentrated, Collective Efforts.

The 13 geographic divisions of the National Electric Light Association will all be functioning before the convention date. The national committees, both general and sectional, have been busily engaged in preparing for the entire membership of the National Electric Light Association concise and up-to-the-minute reports on many timely subjects. The national program of public information has proven very effective, and within 12 mo. this drive toward a nationally informed public on electric problems and achievements, should bring a response of nation-wide understanding. The electrical industry is carrying on in complete harmony, for we are learning the part which each branch of the industry should play in holding the United States in its position as the greatest electrical nation in the world.

Representatives from the national offices of the Association have, during the past year, visited all parts of the country, and this will be the program for the years to come. Personal contact gains for the Association complete understanding and enthusiastic support. The departments at Association headquarters, dealing with public information and service to the industry — whether technical or commercial — have proven their worth to both small and large companies and to the members of the various company organizations. It is with considerable pride that we point to the growing appreciation of the members of this Association, regardless of their position or place in the industry, or the importance of concentrated action in the entire electrical field.

Our greatest work is ahead—hundreds of millions of people to be informed, millions of homes to be made electrical, hundreds of thousands of industries and farms awaiting our service and new technical and commercial questions which are arising and must be solved. Vast hydroelectric development, larger steam plants, many physical connections and extensions of service will be demanded by the public through regulating officials, the daily press and the magazines, but this demand will come from an enlightened populace who will appreciate the value of the service and will be willing to pay what the service is worth. The public has had its lesson in frenzied finance and is already turning to conservative investment in electric light and power securities.

Last May, at Pasadena, the machinery was set in motion for a greater Association with broadened activities and more effective national influence. "Let's go" was the slogan expressed at that time, and today we find ourselves "going good," for we know our goal and intend to reach it.

## T. A. EDISON GREETS FRIENDS ON 74TH BIRTHDAY.

**Edison Pioneers Celebrate Birthday at New Jersey Home—Inventor Predicts Scientific Knowledge Will Develop at Increasing Rate.**

The 74th birthday of Thomas Alva Edison occurred Feb. 11 and was celebrated by the Edison Pioneers and their families at the inventor's home, "Glenmont," Llewellyn Park, West Orange, N. J. The Edison Pioneers is composed of men who became associated with Mr. Edison 30 or 40 years ago. Although all these Pioneers are younger, some by many years, than their chief, there was not one at the birthday reception who appeared more vigorous or more healthy than Mr. Edison himself. On being asked what advice he had to give to the man over 70 years of age, the inventor replied: "The trouble with the man of that age is that he doesn't take enough interest in many things, unless he has been mentally active in his earlier days. If he was he can find much to occupy his mind. There are so many hobbies to work on that a man can continue active up to his death." In commenting on present conditions in the world, Mr. Edison said: "They are very interesting but somewhat complicated. The world is progressing—moving along all the time—and moving faster than ever, for we now have the tools and the knowledge with which to go forward to more and more wonderful inventions. Our increase in scientific knowledge will be much faster in the future than it has been in the past."

After a brief business meeting of the Pioneers, William J. Hammer, president of the organization, delivered an address in which Mr. Edison was referred to as "the world's most useful citizen," in which was told something of Mr. Edison's 1100 patents and in which anecdotes of the days when the Edison laboratory was at Menlo Park were related. Then Mr. Edison was escorted by T. Commerford Martin, chairman of the reception committee, and Frederick A. Scheffler, chairman of the committee on arrangements, to the dais where he received a certificate of membership in the Pioneers, which made him "The Pioneer," an insignia of the organization and a watch fob made of a disk from Alessandro Volta's first electric pile. He accepted these gifts with quiet modesty but refused to make an address, even to these old friends. Mrs. Edison was next the recipient of the insignia of the order, with the assurance that she linked with her husband in the esteem of the Pioneers.

Among the Pioneers who greeted Mr. Edison on this auspicious occasion were the following: W. S. Barstow, president of the General Gas & Electric Co.; W. L. R. Emmet, consulting engineer of the General Electric Co.; W. C. L. Eglin, vice-president and chief engineer of the Philadelphia Electric Co.; William H. Meadowcroft, assistant to Mr. Edison; J. W. Lieb, vice-president of the New York Edison Co.; Alfred O. Tate, former secretary to Mr. Edison and vice-president of the Tate Electro Waterproofing Corp.; Dr. E. G. Acheson, president of the Oildag Co.; George F. Morrison, vice-president of the General Electric Co.; T. Commerford Martin; Major William J. Hammer; H. C. Durand, vice-president of Thomas A. Edison, Inc.; Alfred W. Kiddle, solicitor of patents; Charles L. Edgar, president of the Edison Electric Illuminating Co. of Boston; Samuel Insull, president of the Commonwealth Edison Co.; Robert T. Lozier, consulting engineer of the National Conduit & Cable Co.; John W. Howell, technical engineer of the Edison Lamp Works of General Electric Co., and Frederick A. Scheffler, New York manager of the Fuller Engineering Co., who was elected president of the Edison Pioneers at the Feb. 11 meeting.

## WOLFRAM FOR INCANDESCENT LAMP FILAMENTS.

A detailed description is given in recently released information on the method used by a German manufacturing plant to reduce powdered wolfram metal to such a consistency that it can be drawn to a fine wire sufficiently strong to withstand the shocks to which lamps are ordinarily exposed. The metallic powder—reduced from tri-oxide of wolfram, is first subjected to intense pressure in a steel mould, where it is formed into rods about 0.35 in. square by 8 ins. long. The metal is then heated in an atmosphere of hydrogen and is maintained at white heat by an electric current until it is reduced to a hard solid mass. A hammer operating at about 4000 strokes per minute reduces the bar or rod to a section of about 0.002 sq. in. These rods are treated in a draw bench although difficulty has been experienced in obtaining a suitable lubricant, because the pressure used is so great that all ordinary lubricants prove useless. The most suitable lubricant is sulphide of wolfram ($W_2S$), a white powder similar to graphite, as the sulphur can be removed by heat, leaving only a deposit of pure wolfram. The wire is drawn down to a diameter of 0.004 in. through perforated diamond matrices, and has then a tensile strength of 6000 to 6500 lbs. per sq. in.

Wolfram wire can be heated to a temperature of 3000 deg. C., but is rapidly destroyed by alternating currents. This defect is, however, remedied by the addition of 0.02% of phosphorus.

## PLAN HYDROELECTRIC DEVELOPMENT IN FORMOSA.

The government of Taiwan is considering the advisability of sanctioning the erection by Asano interests of a hydroelectric power plant capable of developing 100,000 hp. on the upper reaches of the Taiko river in the south of Formosa. The Asano interests are promoting the scheme, assisted by American capital and American engineers, and the machinery is to be purchased in the United States.

## ELECTRICAL CONFERENCE MEETS.

At a meeting of the Electrical Conference held in the auditorium of the Underwriters' Association of the Middle Department, Philadelphia, Feb. 16, the following subjects were discussed: "Grounding of Secondaries and Practices in Philadelphia" and "Changes in the 1920 Edition of the National Electrical Code."

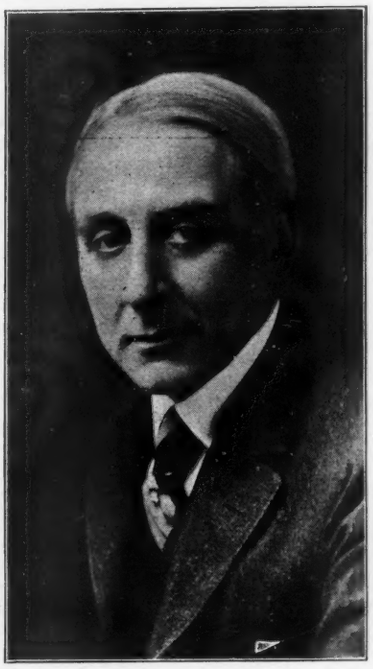
# Building Up Public Good-Will for Electric Utilities

## Publicity Work of National Electric Light Association Begins at Home by Creation of Favorable Sentiment Among Central-Station Employes and Extending Efforts to the General Public

By GEORGE F. OXLEY

*Director of Publicity, National Electric Light Association.*

Good-will is a corollary of confidence, and confidence follows satisfactory service and complete and full information and understanding. The successful man in any line of business in any community is the man who has rendered efficient service or sold high-quality products at fair prices and upon a high-quality merchandising plane. Invariably such men enjoy the good-will of their patrons or clientele because those patrons or clients have confidence in them and in their services or products. This confidence is born of intimate and complete knowledge of the character of service rendered or the character and quality of materials making up the products. Equally invariably, this information which has built up confidence, and thereby created good-will, has been gained by the patrons or clients through direct personal utilization of services or products, and they in turn have disseminated that information broadcast so that the good-will and confidence extends to the community as a whole and not alone to those patrons and clients. Merchandisers of products aid in disseminating that information through the medium of advertising.



**Martin J. Insull.**

As president of the National Electric Light Association his influence is being strongly exerted in the promotion of better relations between utilities and the public, as outlined by Mr. Oxley and others in this issue.

The successful merchant who enjoys the good-will of the community advertises continuously. If he is to put on a sale he does not wait until the day of the sale, but advertises in advance. If the period of sales is not at hand, he still keeps the name of his concern before the public by continuous advertising. Frequently, nowadays, he advertises facts regarding himself or his concern, the nature of the services it gives its patrons, the quality of the goods it invariably sells, and even more intimate facts, so that the individual may feel when purchasing at that store that he or she, instead of being a stranger, is trading with friends.

Admittedly one of the greatest weaknesses of the electric light and power industry has been the fact that it has not in all instances enjoyed public confidence and public good-will, and one of the main reasons for this weakness has been that the industry has not taken the public into its confidence fully and fairly.

One of the greatest present-day businesses, the central station, has not been conducted along the lines which have proved so successful in other business, at least insofar as advertising and publicity are concerned. Rather, it has been conducted as a natural monopoly which people desiring service would patronize of necessity. It, therefore, has fostered a "take it for granted" feeling, although unintentionally. Generally speaking, it has not considered as a part of its duty to the public the information regarding the investment necessary to the conduct of the business, the small margin of profit allowed under regulation, the necessities for constant expansion of plant and distribution systems, except when some such action has arisen as a matter of politics, or as an actual immediate necessity.

The industry has been overlooking for years the fact that it is one of the greatest news sources in any community; that everything which affects it favorably or adversely necessarily is of interest to the community served by it since that community is affected favorably or adversely by the success or failure of its electric light and power company.

Public regulation, constantly and greatly increasing costs of operation, unexpected and excessive demands for service, coupled with a stringent money market which made the cost of money prohibitive in view of the also greatly increased costs of building and of machinery, equipment and supplies, these companies have come to the general realization that in order to properly serve the public they must have public confidence and good-will which will support the companies in their efforts to secure fair rates that they may continue to interest additional capital so necessary for the expansion of the industry and,

therefore, so necessary for the development of communities and contentment of individuals.

This entire question of good-will, of finances, of development and of service, in reality forms a circle. It is like a merry-go-round. Begin at any point and proceed forward or backward and you eventually return to the same point. Each of these points is like a horse on a merry-go-round —it always retains its relative position. Thus a company realizes that efficient service is the most essential element in its success. The company, however, also realizes that it is very necessary to have modern plant and distribution system equipment. That, of course, is of paramount importance if service is to be rendered. The company also has only too definite knowledge that modern equipment costs money, and, therefore, the absolutely essential thing is to secure money. The company has knowledge regarding the point that money can be attracted only when earnings from rates are sufficient to pay the cost of money. It, therefore, is imperative that proper rates be received for the service rendered. The company then is forced to admit that it cannot expect proper rates; *i.e.,* rates which will enable it to operate at high efficiency and to attract investors, unless its service is the most efficient possible. Here we are back at the starting point.

Realizing this and also realizing that the public takes electric light and power company service for granted and has neither knowledge of, nor curiosity concerning the facts, the National Electric Light Association a year ago March 1, inaugurated a publicity department. The duties of this department, in addition to the publication of the N. E. L. A. *Bulletin,* were mainly concerned with fostering public good-will. It became apparent immediately that the National Electric Light Association in itself and the department of publicity as such, could do little or nothing along this line without the full and earnest co-operation of all members of the Association; that whatever it might attempt, or might succeed in doing toward the education of the public would be of little or no lasting value unless the electric light and power companies themselves co-operated in the movement, not only to the extent of disseminating the publicity through the medium of newspapers, direct advertising, posters and otherwise, but also in the matter of rendering the best possible service to the communities they serve, and also by telling their own communities of facts concerning the company and the community which would be of interest locally only and never nationally.

The first efforts of the department of publicity, therefore, were directed toward convincing the executives of member companies of these fundamental necessities and facts. This internal educational campaign, by the way, is continuing and will continue indefinitely. The department of publicity then began the preparation and distribution of pamphlets, all with a "good-will" trend and all designed to teach both electric light and power company officers and employes and the public some of the true facts regarding the interdependability of electric utilities and the public.

In the space of a year the staggering total of 7,000,000 pamphlets have been distributed by the member companies of the National Electric Light Association. Additional pamphlets are being gotten out from time to time, each carrying a definite good-will message to the reader and each being designed to be forwarded by local companies, either to their customers or to selected lists of prominent individuals.

### Publicity Co-operation With Other Organizations.

State committees on public utility information have been organized in eleven states by the representative utility men of those states, and the National Electric Light Association's department of publicity is actively co-operating with these committees in the preparation and dissemination of articles of interest which are so written as to foster good-will. This department is now engaged, in co-operation with the departments of publicity of the American Electric Railway Association and the American Gas Association, in interesting public utility men in other states in the organization of state committees. This work is being directed by John F. Gilchrist, chairman of the Public Utilities Information Committee of the Public Relations National Section of the National Electric Light Association and also chairman of a similar committee of the American Electric Railway Association.

Much of the internal educational material has been forwarded to executives of member companies through "Information Letters" prepared by this department and signed by the executive manager, M. H. Aylesworth.

The National Co-operative Good-Will Advertising Campaign, in which manufacturers of electrical machinery, equipment and supplies are participating, is closely associated with the work of this department. This phase of the publicity work is being covered in another article by P. L. Thomson, chairman of the Manufacturers' Advertising Committee, and it, therefore, will not be dealt with in this statement. Mr. Thomson's article begins on page 297 of this issue.

Much of this work which had its inception a year ago was outlined in a general way and was being carried on prior to the Pasadena convention. At that convention sentiment in favor of the work was crystallized and resulted in the organization of the Public Relations National Section, which, as its name implies, is entrusted with the carrying on of all work of the Association pertaining to relations between the electric light and power utilities, the public and the regulatory bodies. This section is the section most actively engrossing the interest of executives of member companies, just as the Technical Section activities absorb the interest of the engineers and other technicians, the Accounting Section of the accountants and the Commercial Section of commercial managers and salesmen.

While great progress has been made during the last year, the possibilities of this work are enormous, and the task ahead one which will call for the active co-operation and assistance of member companies in steadily increasing degree during the coming year. This is an activity which should be carried on continuously, nationally and locally if the industry is to be successful eventually in winning for itself that degree of public confidence and good-will which will result in the greatest possible mutual benefit for both the industry and the public.

# Auxiliary Equipment in Modern Central Station

## Motor-Driven Pumps and Blowers Operated with Energy from a Transformer Substation—Protective Devices Open Circuit Only to Units After They Fail—Motors Simplify Auxiliary Operation

By D. D. HIGGINS

*Chief Electrician, Northwest Station, Commonwealth Edison, Chicago.*

Expansion in business and developments in equipment have progressed so rapidly in the central-station field during the past few years as to make obsolete both methods and machinery before either have become standard. New machinery has been replaced in many cases almost before it had been thoroughly broken into service, and central-station plants planned to utilize a particular design of equipment have often actually been provided with newer, larger or more efficient units developed between the periods of planning and erection of the plant. Along with the growth and development of the main units there has been an equally interesting development in auxiliary equipment.

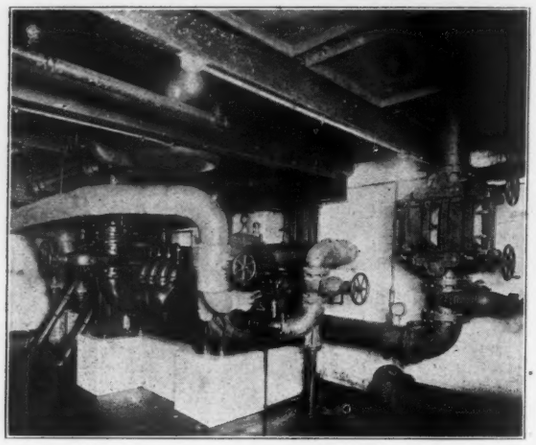
Several specific illustrations of advancement in the design and operation of power-plant auxiliaries are to be found in the Northwest station of the Commonwealth Edison Co., Chicago. This station, placed in operation less than 8 yrs. ago, now houses three different sizes of main units, the last units to be installed having rated capacities 75% in excess of the ratings of the original machines. In addition to the increase in size the entire design of the newer equipment is different in almost every detail, and the changes in auxiliary design and practice have been fully as important as changes in the main equipment.

### Equipment Provided in Original Design and Installation.

The original units around which the design of this plant was laid out were rated at 20,000 kw., provision being made for six generators of this capacity. These machines were built with vertical shafts in conformity with existing practice in the construction of smaller units and were the last large vertical units built in this country. All auxiliaries were steam driven. A 225-hp. Corliss engine, running at a normal speed of 120 r.p.m., was used to drive both the condenser circulating-water pump and the dry-air pump. The circulating pumps are of the Worthington volute type and are direct-connected to the engine shaft, the

**View of Generator Room at Northwest Station of Commonwealth Edison Co., Chicago, Showing Old and New Units.**

dry-air pump being in tandem with the steam cylinder. Water varying in temperature from 38 to 80 deg. F. is handled by the circulating pump, its capacity being approximately 40,000 g.p.m., against a head of 20 ft. Steam is supplied to the engine at a pressure of 230 lbs. gage and at 60 deg. F. of superheat, the exhaust being connected to a closed feed-water heater which is in turn vented to atmosphere.



**Turbine-Driven Air and Condensate Pumps for 35,300-kv-a. Units.**

Two turbine-driven Worthington centrifugal condensate pumps are provided to clear the condenser of each unit. These pumps, driven by 75-hp. Curtis turbines, have a rated capacity of 660 g.p.m., taking water from the condensers at a pressure of approximately 1 lb. absolute and delivering it to the closed feed-water heater.

Oil is supplied to the step bearings of each unit by two slow-speed, duplex, double-acting, horizontal Worthington pumps working against a pressure of 1200 lbs. per sq. in., this pressure being reduced to 800 lbs. per sq. in. for use in the bearings. The pumps have 12-in. steam cylinders, 3-in. oil cylinders and an 18-in. stroke. They are rated at 30 g.p.m. Two smaller duplex, double-acting Blake pumps, rated at 16 g.p.m., deliver oil at a pressure of 50 lbs. per sq. in. for the guide bearings. These pumps have 6-in. and 4-in. steam and oil cylinders with a 6-in. stroke. Return oil from the discharge of the various bearings is drained by gravity to a common receiver tank and then pumped to the filters and coolers by two 6 by 6 by 12-in. single-acting Warren pumps.

Boiler-feed pumps are of the centrifugal type and are driven by steam turbines, two pumps being provided for each unit. They operate against a head of approximately 285 lbs. gage and have a capacity of 700 g.p.m. when operating at a speed of 2300 r.p.m. The turbines driving these units are rated at 125 hp.

### Local-Service Substation for Old Section of Station.

All these auxiliaries take steam at 230 lbs. gage and 60 deg. F. of superheat at the throttle, this being the same quality of steam as that used by the main units. Such an installation represented at the time of its design the latest and most advanced practice in power-plant auxiliary equipment. However, with the growing development of motor reliability, and the increasing demands for steam economy, more and more attention has been devoted to the application of motor drive to certain of the plant auxiliaries.

A 1500-kv-a. substation, consisting of two 750-kv-a. oil-insulated self-cooled transformers with the required switching equipment, serves to reduce the 60-cycle bus voltage from 12,000 to 220 and 120 volts for house service. These transformers are delta connected on the high-voltage side with star connection on the low-voltage side, the 120-volt connection being taken out from suitable taps for lighting service. A reserve set of transformers with a rating of 600 kv-a. is maintained for emergency lighting and power service. These transformers are supplied with power from regular transmission-line busses in the switch house, the lines being protected with standard current-overload relays. These busses supply energy to lines connected with 12,000-volt substations. Each transformer is fed from a separate line bus, but the low-voltage terminals are connected to common 220 and 120-volt house-service busses. The transformers are protected by bellows-type relays on the high-tension side and by open link fuses on the low-tension side.

### Horizontal Equipment Installed in Newer Section of the Plant.

The emergency transformers are connected in the same manner as those for regular service except that they are supplied with energy over a 4000-volt, 3-phase line from a nearby substation. This substation contains a motor-generator set used to convert energy from the 25-cycle system

**Power Board for Auxiliaries in New Section of Northwest Station.**

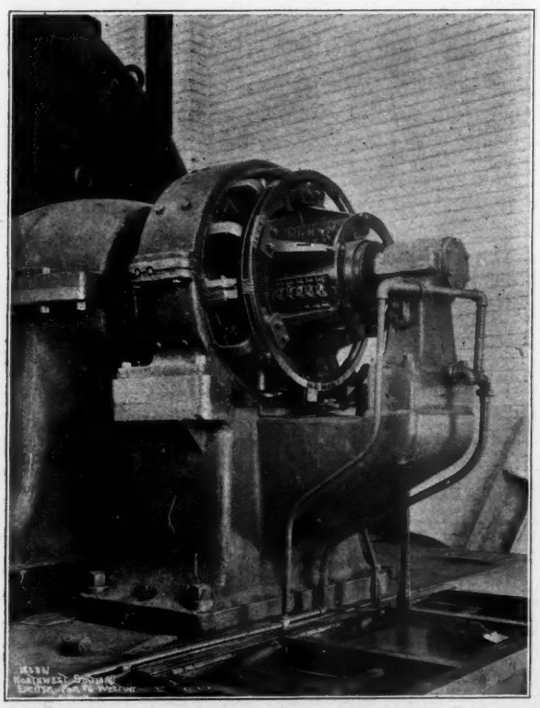
to energy at 60 cycles. Thus emergency power for 60-cycle auxiliary service may be taken from the 25-cycle system.

The main units comprising what may be termed the new section of the plant are all of the horizontal-shaft type. One of these machines is rated at 30,000 kw. and generates electrical energy at 9000 volts at a frequency of 25 cycles. The turbine driving this unit may be described as being of the tandem-compound impulse type. A second unit, driven by a simple impulse turbine, is rated at 35,000 kw. and generates energy at the same voltage and frequency as the first machine. Two other units, rated at 35,300 kv-a., generate energy at 12,000 volts and 60 cycles. The turbines of these two sets are of the reaction single-flow high-pressure and triple-flow low-pressure type. All four of these machines take steam at 230 lbs. gage and 200 deg. F. of superheat, exhausting into the condensers at a pressure of approximately 1 in.

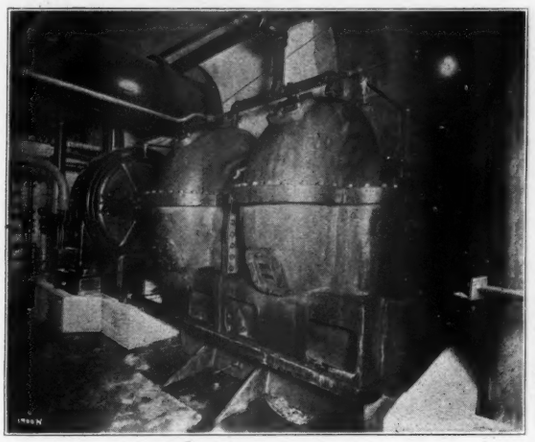
### Auxiliary Equipment Installed With Later and Larger Units.

Circulating pumps supplying condenser water for the new units are driven by 650-hp. induction motors having wound rotors. These motors are operated from 440-volt, 3-phase, 60-cycle circuits fed from a house-service transformer substation. The pumps, as in the original installation, work against a head of about 20 ft., but have a total capacity of 60,000 g.p.m. The pumps are direct-connected to the motors which have a synchronous speed of 360 r.p.m., the actual running speed being slightly less. Push-buttons serve to control the operation of these motors through semi-automatic controllers designed for starting duty only, there being no provision for operating the circulating pumps at less than normal speed.

As originally installed these motors were protected with low-voltage, single-phase no-current, and overload relays and fuses. Experience, however, soon showed the fallacy of over protecting such important auxiliaries, and all protective devices except over-size fuses were accordingly cut out of service. Momentary "dips" in the system voltage invariably shut down one or more circulating pumps when the protective devices



**Individual 250-Volt Exciter Mounted on End of 35,300-Kv-a. Generator.**



**Motor-Driven Wheeler Condenser Circulating Pump.**

were in service. This resulted in the stoppage of condenser circulation, causing the turbines to operate noncondensing with the further result that the condensers became overheated. Then the unit had to be held out of service while the condenser was cooled down to a point where it would again be safe to start the circulating pumps without undue risk of cracking the condenser shell.

Since these various protective devices were removed no interruptions of this nature have taken place. In case of trouble the motors slow down when the voltage drops and promptly re-accelerate when it is restored. In case the motors come to a full stop provision is made in the operating rules for the throwing out of all but the starting contactors. This leaves the motor connected, but with the starting resistance in the rotor circuit. There is sufficient resistance in the rotor circuit, brushes and leads to provide the necessary accelerating torque under increasing load in case the motor is turning at all.

The wisdom of eliminating the standard protective equipment on such important motors, even if of rather large size, is now recognized, and such practice has been followed in several similar installations.

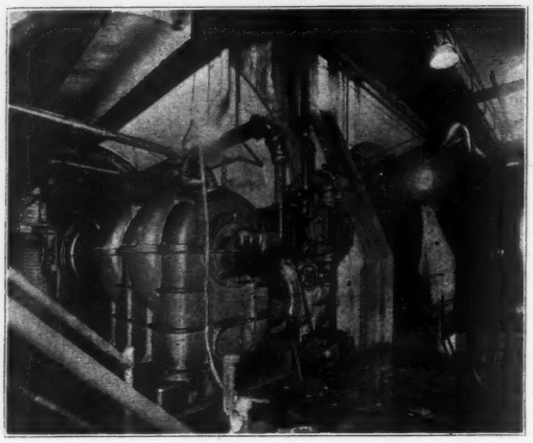
In this way the reliability of the electric auxiliaries of the generating station has been materially increased and now compares favorably with the best type of steam-driven auxiliaries. Electric auxiliary equipment of the future will probably be operated from 4000-volt services, but the general layout will not differ much from that here outlined, except that circulating-pump and economizer motors will be of the variable-speed type.

Condensate and dry-air pumps for the various units are driven by steam turbines running at a speed of approximately 2500 r.p.m., one turbine driving both pumps. The condensate pumps have a capacity of about 815 g.p.m. An oil pump is geared to the shaft of each turbine and a sep-

arate duplex horizontal steam-driven oil pump is provided for stand-by service for each unit.

### Cooling Air Washed and Humidified Before Going to Generators.

Two of the main generating units are provided with external blowers for the circulation of cooling air, one Sirocco blower driven by a 300-hp. 440-volt, 60-cycle motor, running at a speed of 360 r.p.m., being provided for each of these machines. A total of 60,000 cu. ft. of air per min. is delivered by each blower against a pressure of 4 ins. of water. Air supplied by these blowers is humidified by the Carrier system, a 35-hp. squirrel-cage motor being employed to deliver water at a pressure of about 35 lbs. to the spray nozzles distributed over the area of the intake opening



Motor-Driven Westinghouse Condenser Circulating Pump.

connecting the blower room with the intake vault. The cone-shaped sprays from these nozzles cover the entire area of the opening, washing out all dust and humidifying the air. Heating coils are provided to maintain the air entering the spray at a temperature not below 40 deg. F., the humidity being maintained in the fan room at from 90 to 95%. This washed cooling air is discharged from the generator shell through a sheet-metal duct under the boiler-room floor to the air intake of the furnaces.

### Motor-Driven Fans Supply Additional Draft for Economizers.

Cooling air for the original units is taken from the turbine-room basement which connects with a common air-conditioning room for all units in that section as well as the two adjacent horizontal units. Air is circulated through the generators by the fan action of the machine itself and is discharged through a sheet-metal duct to the furnace air intakes at a temperature of about 30 deg. C. above that at the intake to the generators. Washed air is used primarily for cleanliness, making available the full rated capacity of the units in hot weather, and preventing overheating during periods between the annual overhauling. Also, the increased humidity slightly increases the heat capacity of the cooling air. Where properly used—that is, where the washed air goes directly to the generators—it is very effective in keeping coal dust, oil vapor and bugs out of the windings. Washing also removes quantities of dandelion and cotton-wood seeds from the air.

Economizers installed with the new boilers required the installation of induced-draft fans to overcome the additional flue-gas friction loss resulting from the construction of the uptakes. Five 100-hp. and ten 150-hp. motors, direct-connected to Sirocco blowers, are used for this purpose. These motors, like others used for auxiliary drive, run at a speed of 360 r.p.m. and are supplied with energy from the 440-volt, 60-cycle local-service system. They are of the squirrel-cage type and are started and stopped by a push-button control system.

Each motor is provided with an ammeter located on a panel on the boiler-room floor for guidance of the fireman in regulating the draft. These meters have been found to be good indicators of large leaks in the suction side of the fan or uptake. Circuits to these motors are provided with accelerating and overload relays. The operation in starting consists of pushing the "start" button; as the motor comes up to speed the accelerating relay opens the control circuit of the starting contactor and closes that of the running contactor, thus connecting the motor first to the 220-volt and later to the 440-volt busses.

An emergency feeder is provided, running to all these motors and supplied with a full complement of relays, contactors, etc., for use in case of a regular feeder failing. This emergency feeder is also equipped with metering transformers so that power measurements can be made in case of a boiler test.

Stokers for the entire boiler plant have but one type of drive. A 15-hp. induction motor operating at 1200 r.p.m. supplies the power required under normal conditions to drive the line shaft for each row of stokers—10 stokers with each old unit and five double stokers with each new unit. A steam engine is held in reserve for use in case of failure of the motor for any reason. Variable stoker speed with constant motor speed is obtained by means of a ratchet mechanism on each stoker.

### Substation for Supply and Distribution of Energy to Auxiliaries.

Energy for the various auxiliaries is supplied at a pressure of 440 volts from a transformer substation located in the next building just east of the turbine room. There are three 3-phase, 60-cycle transformers, rated at 2000 kv-a. and reducing the 12,000-volt bus voltage to 440 volts for auxiliary service, installed in this substation. Two transformers are required to supply the load and one is held in reserve for emergency use. These transformers are connected each to a separate line bus. The line busses are arranged to connect through switches to two different main busses in the station, to an outgoing line to a substation, and to an incoming line from another generating station.

The low-tension terminals of the transformers are provided with 3-phase hand-operated circuit-breakers equipped with trips connected with reverse-power relays. Overload devices have been eliminated, the idea being to keep the transformers in service under all conditions of overload. The reverse-power relays on the low-tension side, and the overload relays on the line side, serve to

disconnect the transformers only in case of actual line or transformer failure.

The transformers themselves are delta-connected and are provided with 260-volt tops for motor-starting service. They are oil insulated and water cooled. All three transformers connect to one common 440-volt service bus and one common 260-volt starting bus. A 12-panel switchboard is employed to distribute energy from the substation, one set of four panels being assigned to each transformer. The transformers are protected by one Westinghouse current-overload relay, set at 200% overhead, in each phase.

Normally one auxiliary power transformer is held in reserve ready to be thrown into service immediately in case of the failure of one or both of those already operating. This is done in the operating gallery independent of the substation low-tension connections which are handled by the auxiliary-power operator.

### Individual Shaft-Driven Exciters Employed With New Units.

Excitation is provided for in the old section of the station by one 200-kw. induction-motor-driven generator set, the generator being shunt wound for operation at from 125 to 180 volts, and one 300-kw., 125-volt turbogenerator set. Two 1000-ampere-hour storage batteries are provided for emergency service, one of the exciters being operated in parallel with one of the batteries in normal practice. The motor-generator set, having a wide voltage range, is used for battery charging.

The operating bus is normally carried by a 25-kw., 125-volt motor-generator set with the other battery floating on the circuit. This practice is followed in order to separate the operating bus from the excitation system so that trouble in one system will not affect the other.

Each of the main horizontal units in the new section of the station has its own shaft-driven exciter connected with suitable switches directly to the field collector rings without any main-generator field rheostat. All control of the main-generator voltage is obtained by regulating the exciter shunt-field rheostat. The motor-generator set in the old section is arranged with throw-over control so that it may be used with any one of the horizontal units in case of failure of its shaft-driven exciter.

This change from the use of separate excitation systems to the use of shaft-driven exciters has taken place within the past 10 yrs. and marks one distinct improvement in powerhouse design. The use of motor-driven station auxiliaries should be determined upon only after a careful analysis of the individual plant layout involved, the use of economizers being one of the important determining factors in such an analysis.

## NATIONAL SAFETY COUNCIL PLANS MONTHLY CAMPAIGNS.

A plan to apply the Foch strategy which won the world war to the war on industrial accidents is announced at the headquarters of the National Safety Council in Chicago. For 8 yrs. accident work, where it has been organized at all, has been conducted without any centralized control or direction. Although there has been through the medium of the National Safety Council a constant exchange of information regarding the most effective methods of preventing accidents, safety campaigns have been conducted independently in each of the 8000 member plants of the Council. Despite the great strides which have been made in the prevention of accidents by these scattered campaigns, there are still approximately 22,000 workers killed and 600,000 injured in industrial accidents each year. It is expected that the new plan will make possible great reductions in these figures and the saving of hundreds of thousands of dollars.

During 1921 the members of the Council under this new plan are for the first time attempting a unified and intensive accident prevention campaign. The plan announced by the Council calls for a concentrated attack, through all available means, on a different hazard each month, and these attacks are to be carried on simultaneously in all the plants operated by the members of the Council, except where special local conditions warrant alteration of the plan developed at headquarters.

Thus during January in approximately 8000 industrial plants, mines, railroads and other public utilities throughout the country a special campaign was conducted against ladder accidents. It is estimated that 1000 persons are killed in ladder accidents each year. The February campaign, now under way, is against neglect of minor injuries and infections arising therefrom.

Campaigns are announced for the other 10 mo. against the following hazards: March, unsafe clothing; April, horse play; May, hand-tool hazards; June, standing or sitting in dangerous places; July, machinery hazards; August, inattention; September, fire; October, health hazards; November, careless handling of materials, and December, eye injuries.

## CIVIL SERVICE EXAMINATION FOR MECHANICAL ENGINEER.

An open competitive examination for senior mechanical engineer has been announced by the U. S. Civil Service Commission, applications to close March 29. Applicants must have had at least 10 yrs. experience in connection with the design, construction, operation and maintenance of locomotives and tenders, including boilers and appurtenances. Those wishing to make application should write to the commission, Washington, D. C., asking for form 1312 and mentioning the title of the examination desired.

## "EVEREADY" JOBBERS MEET.

A luncheon was given recently by F. A. Wilson-Lawrenson, vice-president and sales director of the American Ever Ready Works, to 60 "Eveready" jobbers and salesmen at the Seelbach Hotel, Louisville, Ky. Mr. Lawrenson outlined the policies of the company and Marquis Regan, merchandising counsel, explained the selling and advertising plans for 1921. James Clark, Jr., of the James Clark Electric Co., spoke in behalf of the Louisville distributors, assuring the company of hearty co-operation in the matter.

# Central Stations and the Wiring and Retail Business

## Better Relations Necessary Between Company and Contractor-Dealer in Interest of Successful Service—Good Contractor a Valuable Asset—Value of Merchandising and Wiring Departments

By HARRY R. ELLIS

*Vice-President and General Manager, Eastern Wisconsin Electric Co., Sheboygan, Wis.*

Relationship of the central-station company to the business of electrical wiring and the retailing of electrical appliances is one of the questions of utmost importance to the electrical industry today. An early agreement on or settlement of just what that relationship should be is vital to all concerned.

The duties and business of the central-station company should be to furnish current and service. By service is meant not alone a steady and uninterrupted supply to the customers, but advice as to proper illumination, lamps, motors, or any device which uses current for any purpose. The general public always has been and always will be skeptical about any article the central-station company may sell or any wiring it may offer to do, fearing that such contrivances will use the maximum amount of current and not the minimum.

Apparently the majority of people cannot see why a central-station company should want to recommend devices which use the least amount of current when it is the business of that company to sell more current. The public is just as skeptical about advice which dealers may give regarding their own wares. An opportunity must therefore be given to compare views and verify or contradict them.

The gas man's statement regarding the economy of a certain range is taken to a plumber; the coal man's advice on how to burn coal economically is usually taken to a dealer for verification. As a matter of fact, the gas company sells a good and economical water heater. The customer, however, goes to the plumber and pays more for a heater which may prove less efficient —because the plumber does not sell the kind of heater the gas company does, and the customer does not believe the gas man's statement as to grade and economy. If the plumber could have made the same profit on the good heater he would have perhaps sold the customer one like the gas company handled instead of an inferior heater that gave him a wider margin of profit.

This is the age of specialization. The central-station man is advising the manufacturer of chairs to make chairs and not electric energy, maintaining that the power business is a business in itself. Electric wiring, known as electrical contracting, is a business in itself. There are few central-station companies that today are doing this wiring without a loss to themselves. If the central-station company was to charge enough to make, say 10% profit over and above all its expenses, the job would cost more than if it was done by an alert electrical contractor who would then be making more money on it than would the central-station company on this class of work.

There is also the possibility that wiring done by the central-station company may be defective according to the code, since the central-station company, in trying to hold down the cost of the installation would execute a poorer job, while the contractor is apt to overdo the requirements in order to get as much as he can.

### Better Mutual Relations Necessary to Successful Electrical Service.

There should be better co-operation between the electrical contractor and the central-station company. The contractor should not expect the central-station company to do all the advertising and soliciting, and merely expect orders to be brought to him on a silver platter. An alert contractor will do his own advertising and thereby profit greatly in conjunction with the central-station company and manufacturers of appliances. Many central-station companies have done as much along these lines as is at the present time practicable for the maximum sale of current.

The electrical contractor cannot be driven out of business by a policy of free, or cost-wiring. He will only be alienated into a condition of antagonism and soon become eligible to join the "anvil chorus." He will only push his other fields the harder. In fact, he has at the present time no small income from installations of isolated plants outside the service lines of the central station. In the meantime, not being in the least interested in anything pertaining to the business of the central-station company, he is in a fit frame of mind to "use his hammer" whenever a present or prospective customer of the central-station company comes to him for information or advice.

Whatever campaign or arrangement the central-station company contemplates, it is good business to get the good will of the electrical contractor—make a friend of him. If he has been fairly dealt with, the contractor is the greatest asset the company can have in a case where a customer, especially one who has just complained about a high bill, goes to the contractor-dealer's store. That contractor will explain and try to satisfy the customer as to the good intentions of the central-station company.

Some years ago a well-known central-station man proposed a triumvirate to consist of the contractor, central station and good will. A new

triumvirate might be organized as a trust without capital—a triumvirate consisting of the contractor, the central-station company and the public. The combination of the contractor and central station should be the trust—not to "do" the public, but to enlighten it—that both may tell the same story to the public. From such a combination the greatest benefits would accrue from advertising and other efforts for promotion undertaken by either the contractor or the central-station company.

Thus will be seen the advantages to both the contractor and central-station company when they understand each other and work together. There would be no fear of situations where the contractor might discredit the central-station company before his friends and patrons, nor would the central-station men discourage or block propositions upon which there had not been an agreement. Such a combination for the promotion of service, if entered upon, will hardly be a violation of the Sherman law and no summons by a grand jury need be expected. The public demands only that there be no discrimination.

### Alert Contractor Valuable Asset to Central-Station Business and Policies.

There are electrical contractors today whose reputation is such that the architect and builder will readily give heed and be influenced by their judgment. A contractor of this standing can prove a good friend of the central-station company when it comes to a question of installing a private power plant as against buying energy from the central-station company. He is also familiar with electrical installations of every character and in many instances can induce a factory manager to discontinue his private plant and take central-station service, where the central-station solicitor would not be given the opportunity to offer arguments in favor of the advantages such a change might make possible.

As electrical contractors are almost always well equipped to solicit business from possible users of electricity it is of very great importance to the central-station company to encourage an attitude of mutual friendliness. Frequently the contractor will go so far as to confer with, or at least notify, the central-station company when he is asked to bid on an isolated plant.

If the electrical contractor is so valuable to the central-station company, let it also be conceded that to him are due certain considerations from the central-station company. First of all, he is entitled to a square deal. For business reasons as well as justice, fair and generous treatment should be accorded him. If this is done, the contractor in 99 cases out of 100 will pass on to his customers the impression that they, too, may expect a square deal from the central-station company and a prompt and proper adjustment of whatever difficulties may arise between the company that sends the bills and the customer who pays them. The business of the central-station company will grow faster by virtue of having an alert contractor looking after one end of it than it can with the central-station company handling the whole thing alone.

In the case of winning over gas customers to modern installations it should be the understanding that the electrical contractor shall exert his best endeavor to put in a lamp installation before the central-station company takes a hand in the game. The contractor, it is true, makes a certain amount of profit from such installations which the company with an equal amount of effort might otherwise obtain for itself, but as, between an energetic contractor and a central-station company which usually has its hands full of other details, the chances are that the latter would not, after all, make much profit.

The usual club of the electrical contractor is the isolated plant. With good service and fair rates a central station company need not fear isolated plants. Nevertheless, many a good customer has been lost by the activities of an indiscriminating contractor. The lost customer is usually ready to come back to the central-station service in a few years, but the business lost by the company in the meantime will never be regained. There are a few cases, of course, where the customer is "stung" by the contractor's plant and might result in a good "I-told-you-so" testimonial. Such a customer, however, will not usually admit his mistake publicly because of his business judgment and pride, but will continue to run with the isolated plant, taking his losses for a few years before again going back to central-station service.

The soliciting value of a contractor is worth more than the few extra sales made on account of lower prices. A contractor should make a fair profit on his wiring.

### Central-Station Bargains Stimulate Consumption of Electricity.

In the sale of electrical appliances it is possible for the central-station company to work what the contractor-dealer considers an injury to his business. The central-station company is interested in the production and sale of electrical energy. Very often it is necessary in the building up of the central-station load that the company offer a bargain to the patrons and prospective patrons of electrically-operated devices. To make the consumers aware of the benefits resulting from the use of electricity they must often be attracted by some evidence of economy.

Where a campaign is started by a central-station company with a view to the introduction of electrical appliances, the contractor-dealer stands no chance whatever in the matter of meeting the company's prices for the apparatus. In such a case, however, there should be no hard feeling on the part of the contractor.

While it may deprive him of a small profit as a dealer for the time being, every appliance that is sold improves his business as a contractor. It is considered good policy for the central-station company to advertise and make known that it is prepared to do wiring and give estimates, and is especially equipped and prepared to plan lighting or power installations. This will open the way for a customer who receives a bid from a contractor to go to the central station and be advised whether the contractor's figures are excessive.

Wherever the community is sufficiently large to warrant the existence of an electrical contractor, he and the central-station company should get together and work to the same end—to increase the use of electricity. Where the central-station company is a competitor of the contractor it will

create friction and the latter, instead of co-operating to increase the central-station load, will seek every opportunity to put in independent and isolated equipment while siding in with the general public in every popular cry against the public utility.

### Contractor Should Advertise More and Receive All the Business.

The electrical contractor has, perhaps, been slightly deficient in one way; that of advertising in the various available forms. Large advertisers of today are usually found to have been the small advertisers of yesterday.

There are certain things which the contractor-dealer can find it to his advantage to do in "playing the game" with the central-station company. He will find it profitably advantageous to maintain an up-to-date show room in which should be displayed all kinds of devices suitable for the home, business or industrial purposes.

Because the contractor-dealer is more closely in touch with his neighborhood, such a display will be more effective than one undertaken by the central-station company, because the former is aiming to stimulate a very local rather than a general demand. The company should, however, maintain an appliance show room of at least equal importance in a central location.

It would seem, therefore, that the wiring business should be left to alert electrical contractors. Should a situation develop where the contractors are not sufficiently energetic and aggressive, it is a simple matter for the central-station company to seek out one who is alert, who will either get all the business or the others will awaken to the necessity of action.

The public needs education with respect to wiring, and the installation of every kind of appliance, and the desire to secure the benefits of electricity must be stimulated just as in the case of any of the other salable commodities of the present day.

Central-station companies and manufacturers of electrical equipment and appliances should not be charged with the entire responsibility of educating the public to the electrical improvements and devices now available. There is an ever-widening use of appliances for the utilization of electricity, and a growing interest in their useful application to our own every-day needs. If, then, the competent and wide-awake electrical contractor-dealers will do their share in the furtherance of this growth, it will hasten the time when the contractor-dealer, the central-station company and the manufacturer of electrical equipment shall reap the rewards of their efforts, and the public will be happily served.

## INVESTIGATIONS IN ELECTRONICS.

Two general types of inelastic impact between an electron and an atom may occur. The first of these results in an orbital shift of the electrons bound in the atom and the second in the complete removal of an electron or ionization of the atom. The respective potential differences through which an electron must fall to acquire sufficient velocity for these two types of collision to occur are known as the resonance and ionization potentials for the particular metal in question. The work on the determination of these constants has been continued by the Bureau of Standards. Work of this character is of theoretical interest from the standpoint of pure physics and of practical interest in that it furnishes further evidence toward an explanation of the phenomena of ionization and related problems which arise in the design of vacuum tubes for wireless telephony and telegraphy, rectifiers, etc.

Two scientific papers entitled "Ionization and Resonance Potentials of Some Non-Metallic Elements," Scientific Paper No. 400, and "Resonance Potentials and Low-Voltage Arcs for Metals of the Second Group of the Periodic Table," Scientific Paper No. 403, respectively, have been published. The first of these gives data for phosphorus, iodine, sulphur, nitrogen, oxygen, and hydrogen, while the second gives data for zinc, cadmium, mercury, magnesium, and calcium, with predicted data for strontium and barium.

## OPPORTUNITY FOR AMERICAN ELECTRICAL GOODS IN FRANCE.

France offers excellent opportunities to the American electrical goods manufacturers, according to a recent statement by M. de Sanchez, director of the economic division of the French High Commission in the United States. He explains that this condition is largely a result of the recent efforts of the French government to promote the development of water power with the object of economizing coal and supplying the cheaper and permanent water power. Explaining the general situation in France, M. de Sanchez said: "France is on a sound economic basis. The total national debt of France is 245,000,000,000 francs, of which but 33,000,000,000 francs are owed outside of the country. If necessary France could pay off the total outstanding foreign debt in the next 2 yrs. There is plenty of money in France, as shown by the quickness with which the public has bought up issues of capital stocks during the past year. Deposits in savings banks have been very large. The French public, like the American, is refusing to buy goods at the present high prices."

## JERSEY UTILITY ADVANCES RATES ON OWN INITIATIVE.

Declaring that the lack of a functioning public utilities commission has prevented a decision on the necessity for increased rates, the New Jersey Telephone Co., an independent company operating in Hunterdon, Warren and Morris counties, has announced the intention of advancing its rates, effective Feb. 1. The increase made by the company on its own initiative will be about 100% over present tariffs.

Recent articles in the technical press, dealing with the position of railway electrification, compares American problems and conditions in this connection with European and more particularly with Austrian ones. Electrification is no less called for in Europe than in America, but for many reasons Europe cannot afford the luxury of the high-voltage, direct-current system now finding favor in America, according to the opinions of some writers.

# EDITORIAL COMMENT

## A Great Business Organization

The electrical industry is fortunate in having, as its principal rallying point, an organization such as the National Electric Light Association, which, from a loose community of interests expressed chiefly in annual gatherings, has developed into a great business organization serving almost every locality in the country where electric light and power are used.

Nor is this service a selfish one, but literally a matter of public utility. As ex-president R. H. Ballard so fittingly expressed it at the Pasadena convention, greater efficiency in production stands to the Association's credit, the country over, and on all sides there is an ever-growing recognition of the indispensability of electric service, together with an appreciation of its still greater applicability to the domestic, civic and industrial needs of the nation. Our country depends more and more upon electric service for its expansion and to a considerable degree for its most vital needs. When the splendid story of electricity's accomplishments shall be told, then will also be told the story of those pioneer developments carried out by men of genius, faith and vision, whose work has been largely in and through the Association, and which this issue of the ELECTRICAL REVIEW in part commemorates.

The specialized departments established at the Association's headquarters in New York under M. H. Aylesworth, its capable and energetic executive manager, and the more intensive work inaugurated through geographic sections, have already been productive of great good; and the influence of the Association is now being extended in many directions.

In the past its work has been confined chiefly to the welfare of central-station companies; but, as Mr. Ballard pointed out on the occasion mentioned, a broadening of its scope has become necessary. Other branches of the electrical industry now demand attention not only because they are increasing in size and growing in strength, but also because they are becoming of greater influence and value in the development of the central-station company's business. The number of manufacturers of electrical apparatus and appliances is fast increasing and the number of electrical dealers and contractors springing up in every territory is indicative of a very large annual increase. The industry needs the added production and the greater outlet, but the interests must all be merged and co-ordinated. That one branch of the industry can prosper independently of the other is a fallacy. Each wing of the electrical industry has a mission to fulfill and a function to perform—not independently, but as a part of the whole. There never was a period when co-operation in the electrical industry was so much needed or could produce such convincing results.

The great question before the Association today is that of public relations, which includes both regulation and financing, and the sentiment voiced by Martin J. Insull, in accepting the presidency of the organization, is undoubtedly the keynote of its most important activities. "I think," said Mr. Insull, "that the American public as a whole is very, very fair, provided it knows the premises on which it has to decide the questions at hand, and one of our great problems during this coming year is to bring before the American public the fundamental economic principles of the public utility business. During the war and after the war period great difficulties were encountered, but, personally, I feel that today the utilities are seeing the sun of prosperity rising, and it will shine on us if we simply carry our work forward. The treatment that we have received at the hands of commissions all over the country, while it may not be all we want, has been reasonably satisfactory. Some commissions have treated us more liberally than others; but, taken as a whole, I think regulation, even through these hard times, has proved to us that it can be made successful provided we and the regulatory bodies and the public co-operate."

Reduced to its simplest terms, therefore, the work of the National Electric Light Association is "Co-operation." It will be the province of the ELECTRICAL REVIEW in the future, as from the beginning in 1885, to promote the co-operation of all branches of the electrical industry—and the public—by every means within its power.

## The Engineer and Utility Valuation

One result of the widespread regulation of public utilities by government commissions has been the necessity for many valuations of utility properties. In rate determinations increasing prominence has been given to the elements of value of the property used in the service and the rate of return allowed upon the same. Obviously, rates must be high enough to cover operating expenses, including depreciation, and to provide the specified return upon the specified value; and while that value is not necessarily fixed by either original cost, reproduction cost, or any other single operation of valuation, appraisals of the property are generally required and engineers are usually called upon to make such appraisals.

The work of the engineer is primarily with the materials of the earth and with the transformations of energy brought about through the use of these materials. His work deals primarily with matters of fact and with the behavior of matter and of energy. He is a most suitable person to

make an inventory of any engineering structure or system and also to determine what is an average of proper unit cost for its construction or preparation for operation. The real work of the engineer ceases at this point in connection with an appraisal. The value of a structure, a machine or a system in the commercial sense can hardly be classed as an engineering fact, and the engineer as such is no more competent to determine such value than the man in the street. Intangible values, which make up such a large element in the valuation of many utility properties, are largely matters of opinion, and in giving such opinions the engineer is no better qualified to act than is the financier, the lawyer or the executive. Indeed, in many cases he is not nearly so well qualified. Moreover, such opinions are not matters of engineering and engineers differ as much in their determinations of them as any other class of people might do. When such opinions are attached to engineering appraisals they cause numerous discrepancies in the valuations by different engineers and thus have a tendency to destroy the repute and confidence of engineers in the eyes of the rest of the community.

When engineers confine themselves to inventories of physical property they have but little trouble in reaching agreement, and even when unit prices are attached to such inventories in order to make utility appraisals of physical property there need not be great disagreements. Refusal upon the part of the engineer to go further than this would be entirely appropriate and proper. If engineers were to confine their efforts to physical appraisals and leave the discussion of intangibles to others, the position of the engineer would be greatly improved and the results of his work would meet with more ready acceptance upon the part of all. Indeed, in matters of fact such as those with which the engineer properly deals, it would be advisable if the engineers, instead of being retained by the different parties to the matter at issue, were to be selected without bias toward either side as independent experts and were to have a relation to the issue only as such and not as advocates for either party.

## *Cultivating Appliance Business*

Central-station managers comparing the cost of obtaining revenue from the use of electric appliances with the expense of securing power and lighting income are sometimes surprised at the disparity in outlay for each dollar of earnings from these different classes of service. It may cost, figuring all items, from 60 to 76 cts. per dollar of revenue to gain income from the use of electric appliances against, say, from 10 to 12 cts. per dollar of power and lighting income. The immediate conclusion is that the cultivation of the former is hardly worth while.

"Let us go after the power and lighting business," says the manager, "and leave this small stuff to develop itself or to be developed through the efforts of the local contractors and supply houses."

It is an open question whether a central-station company should try to gradually eliminate the appliance business as a retail factor in its organization, but we cannot for a moment see any wisdom in losing interest in this kind of work and in failing to push it hard. There are central-station men who have quit the sale of appliances entirely in the belief that this belongs naturally to the supply dealer, and who are glad to get rid of the care and expense of maintaining a display room. In cases where the supply man is energetic this policy may be the logical one to adopt, but whether the central station retails electrical conveniences or not, active campaigning should be maintained without relaxation.

All these devices which go into service advertise electricity by their successful use more than most central-station men of the former class realize; and again, many of them are exceedingly profitable from the standpoint of load-factor. It may cost five or six times as much to get a dollar of income from the washer or electric flatiron as it does to earn a dollar from house lighting, but it may cost the company scarcely anything except operating expenses to supply the former service. Net income after the cost of operation has been met is a pretty significant affair, and it will not do to belittle the earning power of appliances multiplied through a city or town when the time of day in which the demand occurs is taken into consideration.

No, the progressive central-station man realizes that every corner of the electrical field which shows a possible profit is worth cultivating, and until the millennium of the electrically saturated community arrives it will pay to work hard for every dollar of net profit latent in the territory of the modern central station. Some solicitors are best fitted to specialize in factory power, others in introducing domestic appliances, and the far-sighted manager is the one who lets no grass grow under his feet in pushing every possible line of attack on the absorbing powers of his customers.

At the present time the field presents every opportunity for the aggressive. The vast majority of homes in the United States are still without electric service. More and more people are clamoring for the better conditions afforded by electricity. The optimist believes the day is at hand when the demand for electric service will be as great as for food.

# THE WEEK'S NEWS

***Reports of Important Meetings, Developments and Other Happenings of the Electrical Industry and Its Allied Interests***

## WISCONSIN ASSOCIATION TO MEET NEXT MONTH.

**Induction Regulators, Electrical Merchandising and Power Factor to Be Discussed at Joint Meeting of Electrical and Gas Men.**

The 13th annual convention of the Wisconsin Electrical Association will be held in Milwaukee, March 23-24, jointly with the Wisconsin Gas Association, with headquarters at the Hotel Pfister. At the joint session March 23 the following addresses will be given: "Safety," by Charles B. Scott, of the National Safety Rules Committee, N. E. L. A.; "Public Utility Associations," by R. V. Prather, secretary of the Great Lakes Geographic Division, N. E. L. A., and "The Work of the Wisconsin Public Utilities Bureau," by Frantz Herwig, director. A joint convention banquet will be held Wednesday evening, at which N. J. Whelan will act as toastmaster, and Edgar A. Guest will be among the speakers.

At Thursday's session the following papers will be presented and discussed: "Induction Regulators," by Frank Hershey, General Electric Co.; "Electrical Merchandising," by C. E. Michel, sales manager of the Union Electric Light & Power Co., St. Louis; "Symposium on One-Man Car Operation," by B. W. Arnold, H. A. Mullett, R. M. Howard, Dudley Montgomery and C. R. Phenicie; "Street Railway Rate Schedules," by W. H. Sawyer, of the East St. Louis and Suburban Railway Co.; "Power Factor—Methods of Correction, Measurement and Application to Rates," by F. A. Coffin, sales manager of the Milwaukee Electric Railway & Light Co., and "Customer's Demand as a Factor in Rate Making," by L. B. Andrus, American Public Utilities Co.

## A. I. E. E. HOLDS ITS MIDWINTER CONVENTION.

**Limitations of Oil Circuit-Breakers and Cable Insulation Problems Discussed—Edison Medal Presented to Dr. Pupin.**

"High Current Tests on High-Tension Switchgear" and "Short-Circuit Current of Induction Motors and Generators" were among the main topics discussed at the ninth annual midwinter convention of the American Institute of Electrical Engineers held Feb. 16-18 in the Engineering Societies building, New York City. On Wednesday afternoon the board of directors held a meeting, which gave the delegates an opportunity to take a trip to some one of the points of engineering interest, or to visit the local electrical plants.

The Wednesday evening session was opened by President A. W. Berresford's address, which was followed by a paper on "Present Day Practice Limitations of Oil Circuit-Breakers," by H. R. Woodrow, chairman of the engineering department, Stone & Webster, Inc., Boston, and a paper on "High Current Tests on High-Tension Switchgear," by Philip Torchio, chief electrical engineer of the New York Edison Co. Moving pictures and oscillograph records of switches at the instant of failure were shown. This session was under the auspices of the protective devices committee.

At the Thursday morning session, held under the auspices of the subcommittee on wires and cables of the standards committee, the following papers were presented: "The Maximum Safe Operating Temperatures of Low-Voltage Paper Insulated Cables," by W. A. Del Mar, chief engineer of the Habirshaw Electric Cable Co.; "Permissible Operating Temperatures of Impregnated Paper Insulation in Which the Dielectric Stress Is Low," by Philip Torchio, chief electrical engineer of the New York Edison Co., D. W. Roper, superintendent of street department, Commonwealth Edison Co., and L. L. Elden, electrical engineer of the Edison Electric Illuminating Co. of Boston; "Notes on the Effect of Heat on Impregnated Paper from Cable Insulation," by W. S. Clark, engineer of wire and cables, General Electric Co.; "The Effect of Heat Upon Paper Insulation," by H. W. Fisher, chief engineer, and R. W. Atkinson, assistant to chief engineer of the Standard Underground Cable Co.

The Friday morning session was arranged by the instruments and measurements committee, the meeting being occupied with a discussion of the following papers: "Regulation of Frequency for Measurement Purposes," by B. H. Smith, engineering department of the Westinghouse Electric & Manufacturing Co.; "Measurement of Relative Eddy Current Losses in Stranded Cables," by J. A. Cook, assistant chief of laboratory, New York Edison Co.; "An Electromagnetic Device for Rapid Schedule Harmonic Analysis of Complex Waves," by F. S. Dellenbaugh, Jr., secretary of the research division, electrical engineering department, Massachusetts Institute of Technology, and "The Limitations of the Stopwatch as a Precision Instrument," by A. L. Ellis, assistant director of the Thompson laboratory, General Electric Co.

A miscellaneous session was held on Friday afternoon, at which the following papers were presented: "Short-Circuit Current of Induction Motors and Generators," by R. E. Doherty and E. T. Williamson, General Electric Co.; "Hysteresis Effects With Varying Superposed Magnetizing Forces," by W. Fondiller, engineering department of the Western Electric Co.

At the Friday evening session occurred the ceremonies incident to the presentation of the Edison medal to Dr. M. I. Pupin of Columbia University. This medal was founded by the Edison Medal Association, composed of asso-

ciates and friends of Thomas A. Edison, and it is awarded annually by the American Institute of Electrical Engineers. The medal was awarded on Dec. 8, 1920, to Dr. Pupin "for his work in mathematical physics and its application to the electrical transmission of intelligence." Dr. Pupin gained world fame through his invention of the loading coil, thus solving the long-distance telephone transmission problem. A biography of Dr. Pupin appeared on page 36 of the Jan. 1, 1921, issue of ELECTRICAL REVIEW. John J. Carty, past president of the Institute, delivered an address outlining the achievements of Dr. Pupin, and President Arthur W. Berresford presented the medal. Following the medal ceremonies Dr. Pupin gave a lecture on "Wave Transmission," in the course of which he discussed the losses of energy occasioned by the transmission of sound waves, electric waves and luminous waves through material media. The address was accompanied by experiments.

The entertainment features included a dinner-dance at the Hotel Astor, Thursday evening, the purpose being to provide a social function for the entertainment of the members and their guests. An informal reception preceded the dinner.

## STANDARDIZATION OF INSULATED WIRE AND CABLE.

**American Engineering Standards Committee Discusses Unification of Specifications at Conference Held in New York City.**

A conference on the standardization of insulated wires and cables, called by the American Engineering Standards Committee at the instance of the American Railway Engineering Association, was held in New York City recently, there being representatives of 14 national organizations in attendance. After a thorough discussion of the many considerations involved, it was unanimously decided that "the unification of specifications for wires and cables for other than telephone and telegraph use should be undertaken under one general plan, covering substantially all the more important uses."

It was agreed that work on the following should be included: Conductor, quality, stranding, sizes; rubber insulation; varnished cloth insulation; impregnated paper insulation; magnet wire (including enamel, cotton and silk insulation); fibrous coverings (including asbestos); sheaths; armor and standard make-ups.

Nearly a dozen organizations now have important publications on the subject and it was agreed that the proposed work should be a unification of the specifications and standards already in existence, rather than an attempt to formulate entirely new standards, except in fields not already covered.

It was the consensus of opinion that, in order to promote export trade, it would be desirable to have all the American wire and cable standards assembled in a single book. This form of publication, while giving due credit to the participating organizations, would appear to foreign wire and cable purchasers as a complete book of American standards, rather than as the standards of societies comparatively unknown abroad. This has been done in a very thorough way by the Germans and to a considerable extent by the British, thus placing Americans at a decided advantage in foreign trade. It was agreed that if such a book were prepared and given proper publicity in foreign countries it would remove one of the greatest difficulties under which American manufacturers are now laboring in developing export trade. The proposed work will be carried out under the auspices and rules of procedure of the American Engineering Standards Committee.

## OREGON BUSINESS MEN'S ATTITUDE ON UTILITY SECURITIES.

The following is the text of a resolution adopted at the recent convention of the Oregon State Chamber of Commerce:

"Resolved, by the Oregon State Chamber of Commerce that it should be the policy of the state in the regulation of public utilities that the Department of Corporations and the Public Service Commission use their utmost endeavors in formulating constructive policies to establish highest mutual confidence and good will between the public and the public utility corporations to the end that the people of the state be willing to invest in securities of such utilities on equal terms with other progressive western states.

"We recognize as business men the mutual obligation to protect consumer and investor alike so that the former may pay no more than a reasonable rate for service and the latter earn no less than a reasonable return upon the investment, to the end that service may be efficient and adequate and that the capital of our state and other states may be attracted to the public utility industry in order to extend and develop facilities of service to meet the requirements and demands of the industrial development of the state."

## EMPIRE STATE ASSOCIATION MEETS IN ROCHESTER.

**Electrical Production and Distribution Section Discusses Voltage Regulation in Industrial Plants, Transformer Problems, Etc.**

A joint meeting of the electrical production and distribution section of the Empire State Gas and Electric Association was held in Rochester, N. Y., Feb. 10-11. A paper on "The Problems of the Small Plants" was presented by F. A. Dresser, Cortland County Traction Co., which was followed by an address on "The Importance of Close Voltage Regulation in Industrial Plants," by O. W. Bodler, electrical engineer of the Eastman Kodak Co. Other subjects discussed included the following: "Electrical Department Organizations," by T. H. Yawger, Rochester Gas & Electric Corp.; A. C. Jordan, Elmira Water, Light & Railroad Co.; W. C. Blackwood, New York & Queens Electric Light & Power Co.; H. W. Watt, Westchester Lighting Co., and W. C. Pearce, Syracuse Lighting Co.

Col. John P. Hogan, New York Water Power Investigation Commission, spoke on the hydro-electric situation in New York State. A paper on "Testing of High-Tension Insulators Before and After Installation" was submitted by E. P.

Peck, Utica Gas & Electric Co., following which there were informal discussions on "Preservative Treatment of Crossarms"; "Parallel Operations of Single-Phase Transformers"; "What Is Being Done by Member Companies to Conform With the Bureau of Standards Regulations Covering Line Construction"; "Resume of the Policies of the Various Companies Regarding Charges to Customers for Service Extensions," and "Control of Voltage on Long Commercial Circuits." A paper on "The Use of Aerial Power Cables and Grounding Transformers" was read by Francis A. Westbrook, Habirshaw Electric Cable Co.

## NATIONAL LIGHTING FIXTURE MARKET.

Just how many benefits accrued to humanity and the electrical industry itself through the joint convention and Fixture Market this week in Buffalo of the National Council of Lighting Fixture Manufacturers, the Lighting Fixture Dealers' Society of America and the Illuminating Glassware Guild, the future will disclose. The spirit of business optimism and co-operation pervaded all sessions of the three organizations, many constructive problems were considered and interest in the exhibits was at high pitch.

The manufacturers discussed stimulation and protection of new designs and decided to give these serious problems mature deliberation. The dealers were most enthusiastic and on the whole showed satisfaction with the agreements adopted by the manufacturers during the past year relative to construction and business terms, although some resolutions on further agreements were adopted. The Glassware Guild discussed plans for promoting business and increasing the usefulness of glass products for the lighting field. It was decided that the cost of production makes it impossible to reduce prices.

William L. Goodwin advocated the development of new marketing methods for fixtures and the establishment of a policy that will place the institution of fixtures above the individual. He told the manufacturers and dealers they did not appreciate the economic value of service rendered by electrical supply jobbers as stabilizers of the industry. Committees were appointed by the three organizations to investigate the advisability and possibility of a permanently located fixture market.

The splendor of the Lighting Fixture Market in Elmwood Music Hall without doubt surpassed any former lighting exposition. The interest among dealers was keen and the total business done by exhibitors undoubtedly approximated the expected two million-dollar mark. More complete details of the conventions and exposition will be given in the next issue of ELECTRICAL REVIEW.

## ENGINEERS DISCUSS CO-ORDINATION OF INDUSTRY.

"Engineering Leadership in Industry" was the subject discussed by L. P. Alford at the joint meeting of the Detroit Engineering Society and the Detroit section of the American Society of Mechanical Engineers on Friday evening, Feb. 18, in the auditorium of the Detroit Board of Commerce. Mr. Alford is at present temporary executive secretary of the American Engineering Council, as well as vice-president of the Federated American Engineering Societies. The major idea of the talk was the co-ordination of industry, which is the greatest problem confronting our people today. The vast machinery of production, communication and transportation, together with the efforts of all the men and women who are engaged in operating this machinery and equipment, must be directed toward a common end if we are to reach maximum effectiveness. Co-ordination will practically eliminate the idleness of men, the idleness of machines and the misutilization of materials. The task is stupendous, but if the engineer works out a practical solution he will have rendered an extraordinary service to industry and thus to the American people.

## OFFERING OF UTILITY'S STOCK TO PUBLIC.

**Southern California Edison Co. Invites Public to Subscribe for Its Common Capital Stock—Construction Work Planned.**

The Southern California Edison Co., in continuance of its practice of encouraging the public in the territory served to become shareholders, is again offering its common capital stock to the people in Southern California. The stock pays 8% dividends, which at the price of $94 yields a return on an investment of 8.5%. In the last 10 yrs. the gross earnings of the company have been increased from $3,385,000 in 1910 to $14,648,000 in 1920, and the number of consumers from 55,000 in 1910 to 250,000 in 1920. During this period approximately $12,000,000 has been paid in dividends. The company states that the security of this stock rests upon property of large value serving every-day necessities in a territory whose population is large and constantly growing. The uses of electricity are so varied and are also so constantly increasing that the market materially increases every year.

Records show that for the installation of every kilowatt of capacity the electric industry alone receives $110 of business and with the growth in the community assisted by electric development, there is probably an equal or even greater addition of the amount of business coming to other lines of industry.

The Big Creek project which during the next 10 to 15 yrs. will generate an additional 1,000,000 hp., is now being developed by the Edison company, which is also taking steps to bring in, as needed, extensive water powers on the Colorado river. With 2,500,000 hp. of electricity and 3,500,000 acres of arid land brought into rich production, all tributary to Los Angeles, it is

not difficult to see what an important factor this development will be in the company's future growth. The Edison company is carrying on a large amount of construction, having definitely laid out work upon which it will expend during 1921 $12,000,000 to $14,000,000.

## VANCOUVER COMPANY APPLIES FOR CANADIAN CHARTER.

The British Columbia Electric Railway Co., Vancouver, B. C., has applied for a federal charter under the name of the Vancouver, Fraser Valley and Southern Railway Co., which is the name of one of its interurban lines at present in existence. The intention is that the company should, under its new charter, take over the whole of the properties consisting of city and interurban lines in Vancouver, North Vancouver, New Westminster and Victoria, and its light and power systems with the exception of its power plants. The new charter does not include the company's gas properties. It is proposed also to change the name of the Vancouver, Fraser Valley and Southern railway back to the British Columbia Electric Railway Co., or a similar name. The object of this move is to place the company under the jurisdiction of the Board of Railway Commissioners of Canada, a federal body, and by that means obtain the stability as regards fares and rates which will enable the company to raise new capital.

## MEMORIAL FUND PROVIDES MEDALS FOR BELL EMPLOYES.

Employes of the American Telephone & Telegraph Co. who perform conspicuous acts of loyalty and devotion will be awarded medals and gifts of money from the Theodore N. Vail Memorial Fund, which has been subscribed in large part by the wife of the late Theodore N. Vail in memory of her husband. The income from the fund will be used alone in the annual distribution of medals and money to employes of the Bell system in all parts of the United States. All of the medals will be known as the Theodore N. Vail distinguished service medals and half of them will be distributed to female employes and half to male employes. Every associated company in the Bell system will appoint a committee to select annually the employe to whom the medals shall be awarded.

## WESTERN ELECTRIC CO. CONDUCTS LIGHTING UNIT CONTEST.

**Illuminating Equipment Race Stimulates Lighting Fixture Sales in Chicago District—Features of Contest Described.**

With a view of stimulating sales of lighting fixtures, the Western Electric Co. recently conducted in the Chicago district a salesmen's contest under the title of "The Lighting Unit Sweepstakes." Each lighting unit handled by the company was designated to count a certain number of points, the salesman receiving the greatest number being declared the winner. Daily bulletins were issued to inform each salesman of his position in the race, and a large scoreboard also recorded the progress of the "horses." The contest was carried out under the direction of W. M. Goodrich, of the lighting department, who stated that the increase in the sales of lighting units had

**Score Board Which Recorded Progress of Salesmen in Lighting Unit Contest.**

been very noticeable during the progress of the contest.

The following list gives the line-up at the "post" at the conclusion of the "race":

| Horse. | Jockey. |
|---|---|
| 1—Remorse | Olsen |
| 2—Bolshevik | Holmes |
| 3—Dough Boy | Day |
| 4—Sir Barton | Lounsbery |
| 5—Elkahir | Goldin |
| 6—Moonshine | Drury |
| 7—Silver Heels | Wiley |
| 8—Pyramid | Muller |
| 9—Wildcat | Allison |
| 10—Prohibition | Kearsley |
| 11—Man o' War | Thomas |
| 12—Dan Patch | Letourneau |
| 13—King's Ransom | Barron |
| 14—Domino | Cossmann |
| 15—Ship Ahoy | Orr |
| 16—Lou Dillon | Pfeifer |
| 17—Candy Kid | McAlwee |
| 18—Gladiator | Payne |
| 19—Sub-Chaser | Ossenbeck |
| 20—Airship | Johnson |
| 21—Harvester | Marquardt |
| 22—Tommy Tucker | Hawkins |
| 23—Honey Boy | Gilbert |
| 24—Hottentot | Duncan |
| 25—Home Run | Parisien |
| 26—Cannon Ball | Lightfoot |
| 27—Under Fire | Quirk |
| 28—Whippoorwill | Poggi |
| 29—Sunbeam | Jeffrey |
| 30—Touchdown | Caestecker |
| 31—Doc Yak | Pickens |
| 32—Over the Top | Brooks |
| 33—Ting-a-Ling | Simpson |

## ENGINEERING SECTION, N. S. C., TO MEET IN PHILADELPHIA.

**Dust Explosions, Crane Overhoist Limit Stops and Safety Problems Among Subjects to Be Discussed at Midwinter Meeting.**

Practically all of the data available on the subjects of dust explosions, crane overhoist limit stops, signals and signalling in industry, and the relation of boiler accessories to safety will be gathered together and discussed at the midwinter meeting of the engineering section of the National Safety Council which is to be held in Philadelphia Feb. 28. The meeting is to be held

jointly with the Philadelphia section of the American Society of Mechanical Engineers and the Philadelphia local safety council of the National Safety Council. Members of the Philadelphia section of the Association of Iron and Steel Electrical Engineers have been invited.

The program consists of the following papers: "The Engineering Aspects of Signalling," by A. H. Rudd, chief signal engineer of the Pennsylvania System, Philadelphia; "Crane Overhoist Limit Stops," by D. M. Petty, electrical engineer of the Bethlehem (Pa.) Steel Co.; "The Relation of Boiler Accessories to Safety," by Warren Hilleary, superintendent of schedule rating of the Royal Indemnity Co., New York City; "The Lubrication of Air Compressors," by Dr. A. D. Risteen, director of technical research of the Travelers' Insurance Co., Hartford, Conn.; "Lessons from Electrical Fatalities," by S. E. Whiting, assistant chief engineer of the Liberty Mutual Insurance Co., Boston; "A Broader Field for the Engineer," by Prof. Dexter S. Kimball, Engineering College, Cornell University, Utica, N. Y., and "Safety—The Fundamental of All Engineering," by L. A. DeBlois, engineering section, E. I. du Pont de Nemours & Co., Wilmington, Del.

## ELECTRON THEORY DISCUSSED AT A. I. E. E. MEETING.

An address on "Some Elements of the Electron Theory of Matter" was given by Vladimir Karapetoff, consulting engineer and professor of electrical engineering, Cornell University, Ithaca, N. Y., at the February meeting of the Pittsburgh section, American Institute of Electrical Engineers. The subject was treated from the point of view of an electrical engineer who anticipates various practical applications of the electron theory. The speaker outlined some recent fundamental experiments and discussed the mathematical relationships by means of which the size of the electron, its charge, velocity, etc., may be computed.

## CONTRACTOR-DEALERS INVITED TO SALES CONVENTION.

Under the auspices of the Newark Electrical Supply Co., 223 Market street, Newark, N. J., the oldest and one of the largest electrical jobbers in the state of New Jersey, a merchandising convention to which every electrical contractor-dealer in the state has been invited, will be held Feb. 22 for the purpose of acquainting them with the big co-operative campaign this supply house is about to launch. The program will constitute sales talks on various lines of electrical home appliances and conclude with a dinner at which the launching plans for the merchandising campaign will be consummated.

## CIVIL SERVICE EXAMINATION FOR ASSISTANT ENGINEER.

An open competitive examination for assistant engineer has been announced by the United States Civil Service Commission, applications to close March 15. The duties of the appointee will include supervision of the preliminary report of the survey of the Tennessee river covering the potential development of its water resources, including navigation and the relation to navigation of possible hydroelectric development, flood protection, water supply, etc., and the extent to which such development would affect the United States, the states, municipalities and private interests. Those desiring to make application should write to the commission, Washington, D. C., asking for form 1312 and mentioning the title of the examination desired.

## COMING CONVENTIONS.

Associated Manufacturers of Electrical Supplies. Annual convention, New York City, March 15. Headquarters, 30 East 42d street, New York City. General secretary, Charles E. Dustin, Hartford, Conn.

Electrical Supply Jobbers' Association. Quarterly meeting of Atlantic Division, New York City, March 15. Headquarters, Hotel Commodore. Secretary, E. Donald Tolles, 52 Broadway, New York City.

Joint meeting of Illinois State Electric Association, Illinois Electric Railways Association and Illinois Gas Association, Chicago, March 15-17. Headquarters, Sherman House. Secretary, R. V. Prather, Springfield, Ill.

American Washing Machine Manufacturers' Association. Meeting at Sherman Hotel, Chicago, March 16-17. Secretary, Enoch B. Seitz, Otis building, Chicago.

Wisconsin Electrical Association. Annual convention, Milwaukee, March 22-24, jointly with the Wisconsin Gas Association. Secretary, J. P. Pulliam, 1408 First Wisconsin National Bank building, Milwaukee.

Kansas City Electrical Show. First annual electrical exposition, Convention Hall, Kansas City, Mo., April 18-23. Manager, Sam Furst, Electrical Trades Exposition Co., 802 Broadway, Kansas City, Mo.

American Electrochemical Society. Spring meeting, Atlantic City, N. J., April 21-23. Headquarters, Hotel Chalfonte. Secretary, Joseph W. Richards, Lehigh University, Bethlehem, Pa.

American Society of Mechanical Engineers. Spring meeting, Chicago, May 23-26. Headquarters, Congress Hotel. Assistant secretary, C. E. Davies, 29 West 39th street, New York City.

Electrical Supply Jobbers' Association. General meeting, Hot Springs, Va., May 25-27. General secretary, Franklin Overbaugh, 411 South Clinton street, Chicago.

Pacific Coast Geographic Division of the National Electric Light Association. Annual convention, Del Monte, Cal., May 25-27. Headquarters, Hotel Del Monte. Secretary, L. H. Newbert, 445 Sutter street, San Francisco.

National Electrical Light Association. Annual convention, Chicago, May 31-June 3. Headquarters, Drake Hotel. Executive manager, M. H. Aylesworth, 29 West 39th street, New York City.

North Central Electric Association. Annual convention, Duluth, Minn., June 14-16. Secretary, H. E. Young, 15 South Fifth street, Minneapolis, Minn.

Tri-State Water and Light Association. Annual convention, Asheville, N. C., June 15-16. Secretary, W. F. Steiglitz, Columbia, S. C.

National Fire Protection Association. Annual convention, San Francisco, June 14-16. Secretary, Franklin H. Wentworth, 87 Milk street, Boston.

American Institute of Electrical Engineers. Annual convention jointly with the Pacific Coast convention, Salt Lake City, Utah, June 20-25. Secretary, F. L. Hutchinson, 33 West 39th street, New York City.

National Association of Electrical Contractors and Dealers, Anniversary convention, Buffalo, N. Y., July 20. Secretary, W. H. Morton, 110 West 40th street, New York City.

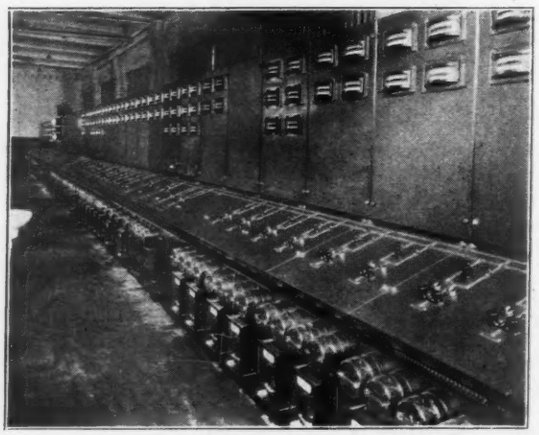
# OPERATING PRACTICE

***Methods and Problems Embracing Operation and Installation of Power-Plant Equipment and the Distribution of Electrical Energy***

## LARGE SWITCHBOARD FOR SERVICE IN SOUTH AFRICA.

**Double Set of Busses Are Employed to Control Two Types of Circuits—Ultimate Maximum Capacity of Machines, 30,000 Kw.**

The city of Capetown, South Africa, recently purchased from the General Electric Co., Schenectady, N. Y., one of the largest switchboards ever built by that company. This board will be installed in their new Dock Road power house, and will take care of the entire light, power and railway load of the city and surrounding districts. The panels composing the many sections are arranged to form an inclosed bench board 101.5 ft. long with an overall height of 90 ins. The depth of the bench board is 6 ft. 5 ins. from the back wall to the front of the switchboard subbase sections. It is designed to control both 11,000-volt, 3-phase, 3-wire, 50-cycle circuits for transmission purposes, and 2200-volt, 2-phase, 3-wire, 50-cycle circuits for the local industrial



Switchboard for Dock Road Power House, Capetown, South Africa.

and lighting requirements. The total capacity of the machines controlled by the board at present is 11,500 kv-a., but the ultimate maximum capacity will be 30,000 kw.

Each of the two types of circuit on the board is equipped with a double set of busses so that when new apparatus is being installed or repairs being made there will be no interruption of service while the installation or repairing is under way. Oil circuit-breakers connected between the busses of like voltages provide the means of throwing the load from one set to the other. The entire back portion of the bench board is inclosed in grill work so that no live parts are accessible to the casual observer. Differential and overload relays having instantaneous or time-limit features are installed for the protection of all circuits.

The board is equipped almost entirely with standard apparatus. However, additional features which are made necessary by the installation have also been included. One of these features is a mimic bus of the system laid out on the control bench. This bus gives a diagrammatic representation of the station circuits in which the oil switches are represented by their own control switches, and the generators and transformers by name plates. By this scheme the operator can tell at a glance just which of his disconnecting switches or oil circuit-breakers are open or closed.

Another point of interest is the signal-line system which enables the operator at the board to signal the machine attendant. This signal system consists of a push-button signal box on the section of the board which controls any particular machine, and another similar box mounted on a pedestal near the machine. When the button is pushed a lamp is lighted and a bell rung in the pedestal box to attract the attendant's attention and show him which machine is indicated. By a series of signals the two men can speak to each other in code.

When it becomes necessary to increase the capacity of the board, the required equipment can be installed on what are at present blank panels without in any way interfering with the service of the station or disturbing the permanent connections.

## TRANSMISSION AND DISTRIBUTION LOSSES ON LARGE SYSTEM.

**Improvements in System Reduce Losses in Lines and Transformers—Effective Station Capacity Increased by Increased Line Efficiency.**

Not all the energy produced in the power plants of even the most efficiently operated central-station company can be sold to the customers. Data presented in a recent issue of the Pacific Power & Light Co. *Bulletin* indicates the magnitude of the actual distribution losses of that company. An accompanying table shows the number of kilowatt-hours of powerhouse output and purchased energy and what becomes of it, and the percentages of the various uses and losses to the whole. It must be borne in mind that powerhouse output does not mean "generated," but only what can be put on the transmission line after powerhouse uses are taken care of. It will be noted that in 1919 there was actually sold a smaller percentage of the powerhouse output and purchased energy than in 1918. This was because of the fact that heavy transmission and transformation losses were experienced due to the small capacity of the Yakima valley line. This line is being rebuilt. The transmission losses

in the table include considerable energy used by the power department. On the other hand, the distribution losses were less both in percentage and in actual amount. Some of the districts are doing better work in getting rid of inefficient transformers, small feeders, poor insulation and trees.

Another table shows the records for the districts, the figures being the percentages of feeder output that are unaccounted for in each district for the 2-yr. period of 1919-1918.

TABLE SHOWING GENERATING-STATION OUTPUT, METERED ENERGY AND LOSSES.

| | 1919. Kw-hrs. | % | 1918. Kw-hrs. | % |
|---|---|---|---|---|
| Customers meters | 49,462,743 | 68.8 | 46,044,258 | 70.5 |
| Company uses | 1,946,473 | 2.7 | 1,693,313 | 2.6 |
| Total sales and use | 51,409,216 | 71.5 | 47,737,571 | 73.1 |
| Distribution losses | 7,301,076 | 10.1 | 8,119,674 | 12.4 |
| Total feeder output | 58,710,292 | 81.6 | 55,857,245 | 85.5 |
| Transmission and transformation losses | 13,241,776 | 18.4 | 9,487,090 | 14.5 |
| Output and purchased energy | 71,952,068 | 100.0 | 65,344,335 | 100.0 |

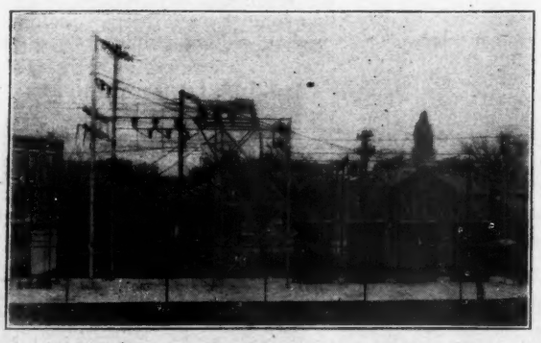
TABLE SHOWING UNACCOUNTED FEEDER OUTPUT FOR VARIOUS DISTRICTS.

| District. | 1919. % lost. | 1918. % lost. |
|---|---|---|
| Astoria | 12.9 | 15.6 |
| Dayton | 20.0 | 26.6 |
| Goldendale | 20.1 | 23.5 |
| Hood River | 27.8 | 37.0 |
| Pasco | 5.3 | 10.9 |
| Pendleton | 13.5 | 17.8 |
| Pomeroy | 26.1 | 19.0 |
| Prosser | 11.9 | 9.4 |
| Seaside | 8.7 | 10.3 |
| Sunnyside | 22 4 | 24.6 |
| The Dalles | 10.3 | 10.0 |
| Toppenish | 15.8 | 15.5 |
| Walla Walla | 13.4 | 13.8 |
| White Salmon | 27.8 | 38.3 |
| Yakima | 15.7 | 18.2 |
| Company total | 12.4 | 14.5 |

## OUTDOOR SUBSTATION BUILT WITH PIPE-WORK STRUCTURE.

### Clamps and Fittings Galvanized in Place to Provide Better Protection From Weather and Facilitate Erection on Job.

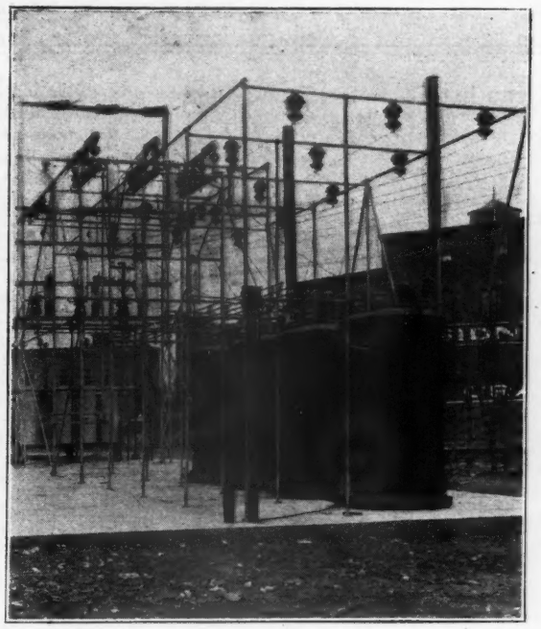
Outdoor substation developments of recent months have produced numerous examples of interesting construction and operating features. The accompanying illustrations show an outdoor substation on the system of the Miami Valley



Substation for Local Service at Sidney, O.

Electric Co., Sidney, O. The distinctive feature of this type of station is the structure upon which the various pieces of equipment are mounted. This structure is a combination of pipe framework and Bates expanded-steel poles. The switching apparatus and the high and low-voltage bus work are carried almost entirely on the pipe structure, the expanded-steel poles being used to take the strain of the incoming lines.

The use of pipe framework for outdoor substation construction is a comparatively new development and appears to be meeting with considerable success. The pipe framework in this installation was fabricated in the factory of the



Side View of 33,000-Volt Outdoor Substation Erected With Pipe Framework.

Electrical Engineers Equipment Co., Chicago, then the structure was knocked down and sent to the galvanizers with the "3-E" clamp-type fittings clamped in their proper position. The various members were galvanized in this manner and then shipped to the job. The pipe structure is readily assembled on the job without the necessity of riveting and other operations, which are necessary when a steel structure is used.

A number of these pipe structures have been constructed recently, and all are reported to be giving good service. The primary voltage of this substation is 33,000, this potential being stepped down to 2300 volts for local distribution.

## PEAK LOAD FOR 1920 CARRIED AT EARLY DATE.

With a load of 80,543 kw. the Public Service Co. of Northern Illinois carried its peak load for 1920 on Nov. 23 at 5:30 p.m. The occurrence of the peak at an early date is not unprecedented. In fact, the annual peak has been reached on this system even earlier than Nov. 23.

TABLE SHOWING ANNUAL OUTPUT OF PUBLIC SERVICE CO. OF NORTHERN ILLINOIS.

| Year. | Kw-Hrs. |
|---|---|
| 1918 | 281,434,463 |
| 1919 | 325,510,558 |
| 1920 | 336,401,196 |

In 1919 it came on Dec. 2 at 5:30 p. m., when the output was 78,568 kw. In 1918 the maximum was reached Dec. 16, the figures being 77,683 kw.

The accompanying table shows the total kw-hr. output generated during the years mentioned for the year ending Nov. 30.

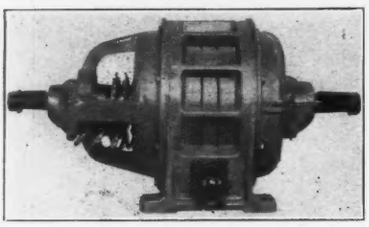
Of the stations which contributed this energy the plant at Blue Island was the leader last year. It turned out 57% of the whole output.

# APPLIANCES and DEVELOPMENTS

***New, Improved or Interesting Electrical and Mechanical Apparatus and Devices, and Applications of Equipment and Methods in Practice***

## Alternating-Current Crane and Hoist Motor.

The General Electric Co., Schenectady, N. Y., has developed a new type of alternating-current motor for operation on cranes and hoists. These motors, known as Type MTC, are designed to take the place of the former MTC and ITC types, and have several features which are radical improvements over the old design. They are



**Type MTC Motor for Crane or Hoist Service.**

generally smaller in diameter and longer than motors of the same horsepower in the old design, which reduces the armature flywheel effect. They also have larger shafts and bearings. At rated frequency and voltage their maximum stationary torque is twice the running torque. All motors of 40-hp. capacity and below are rated on a 50-deg. C. rise in temperature in 30 min., and from 50-hp. up on a 60-min., 50-deg. C. rise in temperature.

A new resistor has been designed for work with the new motors that leaves enough resistance in the rotor circuit when the controller is on full, to cause the motor to run at approximately 89% below full-load rated speed when delivering full-load torque. There are several advantages to be gained by the use of this resistor, including reduced maintenance and smaller maximum current demand. It also protects the motor from abuse on the part of the operator or from abnormal working conditions.

## "Eveready" Flashlight Proves Invaluable to Balloonists.

Three United States naval balloonists left their station at Rockaway Park, Long Island, in December last, on a more or less routine test flight. Three days later they landed in the frozen wilds of Canada, without maps, without food and without proper clothing to withstand the intense cold scores of miles north of civilization—lost in a mass of snow and ice—but famous! The story of Lieutenants Kloor, Hinton and Farrell and their ill-fated journey is now history. But it is not so universally known that a small and comparatively insignificant "Eveready" flashlight was one of the things which contributed so much to the ultimate safety of these three flying men and helped to guide their failing footsteps to the Hudson Bay Co.'s post at Moose Factory.

"We left Rockaway equipped with two 'Eveready' flashlights, two extra batteries and two extra bulbs. It is no exaggeration to say they proved a veritable god-send," says Lieutenant Kloor, the pilot. "Owing to the highly inflammable gases with which the bag is inflated, matches or open flames cannot be used in a balloon. For night flying the dials of all instruments are covered with a phosphorescent substance, but on our first night the fog and storm rendered this useless and we relied on our 'Eveready's.' When it became apparent during the night that we had lost our bearings we tried flashing the blinker code, but owing to the extremely heavy fog we got no response. I have no doubt that on a clear night such messages flashed from a balloon could be easily picked up from the ground. In making our landing the extra batteries and bulbs were lost from the balloon, but we did manage to salvage one 'Eveready,' and during those 4 days and nights as we struggled in the wilderness we found it invaluable. Searching for bits of dry wood at night or for any signs that might indicate a trail or habitation of any sort, we used our 'Eveready' almost constantly."

Arriving safely at Moose Factory, Lieutenant Kloor presented his "Eveready" to J. L. Gaudet, manager of the post, in grateful appreciation of the part played by the post in the rescue of the balloonists.

Commenting on this experience Emmett Moore, assistant general sales manager of the American Ever Ready Works, said: "Very few of us have occasion to go ballooning, and to be precipitated in the wilds of the north, but in our daily and nightly life we are all subjected to the dangers which lurk in the dark and should guard against these dangers by having our flashlights handy."

The company has suggested to its dealers that whenever there are local accidents due to darkness and which "Eveready" might have prevented, advertising be built around the occurrence. One very simple way of doing this is to clip the story of the accident from the local paper, paste it on a card with a caption reading—"An 'Eveready' Might Have Prevented This." A window display built around this card is a sure attention-getter and sales stimulator.

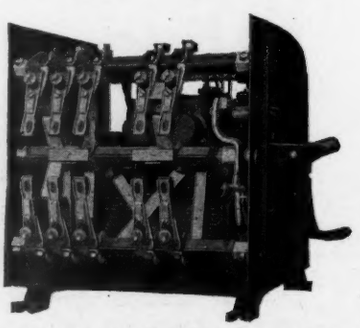
## New Autotransformer Starter for Induction Motors.

Central-station regulations almost universally require that standard squirrel-cage induction motors of 5-hp. rating or over be provided with starting devices in order to avoid the line disturbances resulting when the motor is started by connecting directly to the supply system. For various reasons the autotransformer starter or compensator is generally considered to be the most satisfactory device for this service. The squirrel-cage motor because of its inherently simple construction will withstand unusually severe service with only an occasional overhauling. This cannot be said of starting devices as a class and, therefore, where squirrel-cage motors are used the weakest link in the power system is generally the starter or controller. The value of a dependable starter is generally realized in those industrial plants where a shut-down, if for only a short time, is costly in terms of wages and finished material.

The engineering department of The

**Starter for Squirrel-Cage Motors of From 5 to 100-hp. Capacity.**

Cutler-Hammer Manufacturing Co., Milwaukee, has devised an autotransformer starter of unusually rigid construction to meet the severe requirements of the large industrial plant and mine, as well as those of the small mill and factory. The simple steel construction—using no wood or castings whatsoever—the absence of flexible moving leads and the ease of inspection of the contacts and adjustments of the relays, enable this starter to give continuous and satisfactory service at a low upkeep cost. This starter which is shown in the accompanying illustrations, consists of two autotransformers, commutating mechanism, low-voltage release and du-

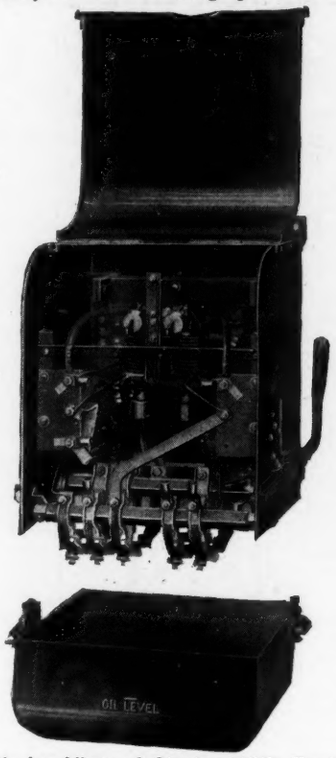


**View Showing Construction and Arrangement of Fingers.**

plex overload relay, all inclosed in a sheet-metal case with the operating lever outside. The case is strongly reinforced with angle iron and has a hinged cover which can be lifted to expose the transformers and relay. The transformers and case are carried directly on the supporting brackets and may be readi-

ly mounted on the wall, switchboard or any post or pedestal.

The starter is operated by moving the operating lever forward to the starting position and then backward to the running position where it is held in place by the low-voltage mechanism, interlocks preventing the moving of the lever directly to the running position. If




**Interior View of Starter With Tank Lowered and Cover Lifted.**

released in the first or starting position, the lever is returned to neutral by a spring. It may be locked in the neutral position to prevent unauthorized operation.

Two autotransformers connected in open delta are used for both 2 and 3-phase service. Special construction of the transformer core allows either coil to be easily and quickly replaced. Each coil is provided with three accessible taps which give 50, 65 and 80% of full line voltage. The oil-immersed commutating mechanism is placed at the bottom of the case below the transformers and may be exposed for inspection by the removal of the oil pan. An ample head of oil is maintained above the contacts, and a double horizontal break is provided in each line. It is said that breaking the circuit horizontally confines the arcs between the copper contacts and prevents burning of parts not designed for that service. The sliding action of the contacts keeps them clean and breaks any film of oil which might form between them and produce destructive arcing. The contacts are carried on steel supports clamped on insulated square steel bars. The stationary contacts are drop-forged pieces of copper carried on fingers of standard C-H construction. These fingers are of the nonstubbing type and are easily adjusted and renewed. The moving contacts or segments are short copper strips made reversible so as to give double the normal amount of service.

The low-voltage mechanism is mounted inside the case on the right-hand side. A wire from the armature of the release coil extends through the case near the operating handle and is bent to form a hook, a slight pull on which releases the starter and returns the handle to neutral. Remote control and stopping may be obtained by inserting one or more normally closed push-button switches in the low-voltage coil circuit so that pressing any one of the buttons releases the starter mechanism.

A duplex overload relay with a true inverse-time-limit-movement is mounted inside the case on the transformer assembly in such a position that adjustments for time and current values can be readily made. This duplex relay is equivalent to two overload relays each in series with 1 of 2 phases. Underwriters' rules do not require installing a disconnecting knife switch or circuit-breaker ahead of this starter when thus equipped, because the starter completely disconnects the motor from the supply line when released by an overload.

Rigid copper leads are used throughout with the exception of four flexible stationary leads to the transformer taps and low-voltage coil. The flexible leads are out of the way of the moving parts, therefore, all danger of the leads becoming broken or grounded by bending or rubbing is eliminated. These starters are made in various sizes for the operation of 2 or 3-phase induction motors, rated at from 5 to 100 hp., on standard commercial voltages between 110 and 2200 and at frequencies of 60, 50, 40, 33 and 25 cycles.

## Electroplating Generator With Link-Belt Drive.

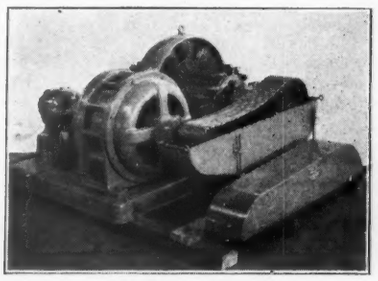
Improvements recently made in the design and method of operation of low-voltage generators, while not so widely published as improvements in high-voltage equipment, are, nevertheless, quite interesting and important. In the machine now being made by the Chandeysson Electric Co., St. Louis, the current is collected from the brush studs, which are made of copper, by threading these studs directly into the rocker arm which is made up of two insulated sections. With this arrangement cables are not required. The rocker arms are adjustable, although adjustment is not required between noload and 40% overload, according to the statement of the manufacturer.

Another feature in the design of these machines is the use of several strips of flat copper in parallel instead of one solid conductor for the armature coils. These strips, four in number, fit between the commutator risers (five in number) after the fashion of a multiple-blade switch. The top and the bottom leads are separated by spacers. In this type of construction soldering is not depended upon to carry the current, but when the risers and the end of the armature coils have been tinned soldering is found remarkably easy.

The outfit shown in the accompanying illustration consists of a 5000-ampere, 6-volt, separately excited Chandevsson generator running at a speed of 360 r. p. m. and mounted on a substantial castiron sub-base. A 50-hp., 3-phase, 60-cycle, 1150 r. p. m., squirrel-cage motor, and an excitor which is direct-connected to the motor, are also mounted on the sub-base. The generator is driven by the motor by means of a link belt running in oil. The complete outfit, as may be seen from the illustration, is compact and has a neat although rugged appearance. The best speed for a 5000-ampere, 6-volt, electroplating dynamo is in the neighborhood of 360 r. p. m.; on the other hand, a speed of 1150 r. p. m. is excellent for a 50-hp., 3-phase, 60-cycle squirrel-cage motor when everything is taken into consideration, and a speed of 1150 r.p. m. for the excitor is considered entirely proper by the manufacturer.

The link belt, manufactured by the Link-Belt Co., Chicago., brings together two machines, each running at the correct speed.

Tests made on two machines built



**Electroplating Generator Connected to Induction Motor by a Link Belt.**

for the Simons Bed Co. were intended to test the generators as well as the link belt. The outfits were run coupled together so that by varying the field current one of the low-voltage machines could be made to run as a motor and the other as a generator, the corresponding induction motor becoming either a motor or an induction generator. The machines were run with fixed brushes and a load of 7000 amperes for approximately 8 hrs. During that time each machine was caused to act as a motor and then as a generator, the pull on the chains reversing when a machine was changed from motor to generator, since, when acting as motor it was pulling and when acting as generator it was pulled.

The changing from motor to generator was repeated a large number of times, a change of one machine running at full load as a motor to full load as a generator being accomplished in probably less than a second. Results obtained in this test were said to be entirely satisfactory.

## Calorel Metal Ribbon Resistor.

The National Electrical Supply Co., Washington, D. C., is manufacturing a new resistor for heating devices, rheostats, instruments, etc., designated as "Calorel" ribbon. This resistor is said to mark a distinct advance in the production of resistances. It is a flexible metal ribbon 0.375 in. wide and 0.01 to 0.025 in. thick. It is produced by automatic machinery from round wire, and can be made special in copper, nichrome, silver, iron, etc. The resulting ribbon is said to have many times the resistance of an ordinary ribbon of the same material and dimensions.

## "Humanity" Electric Washer.

The proper way to wash clothes is to force the water through the clothes and the clothes through the water, while the soap is used to absorb the grease, according to the Central Manufacturing

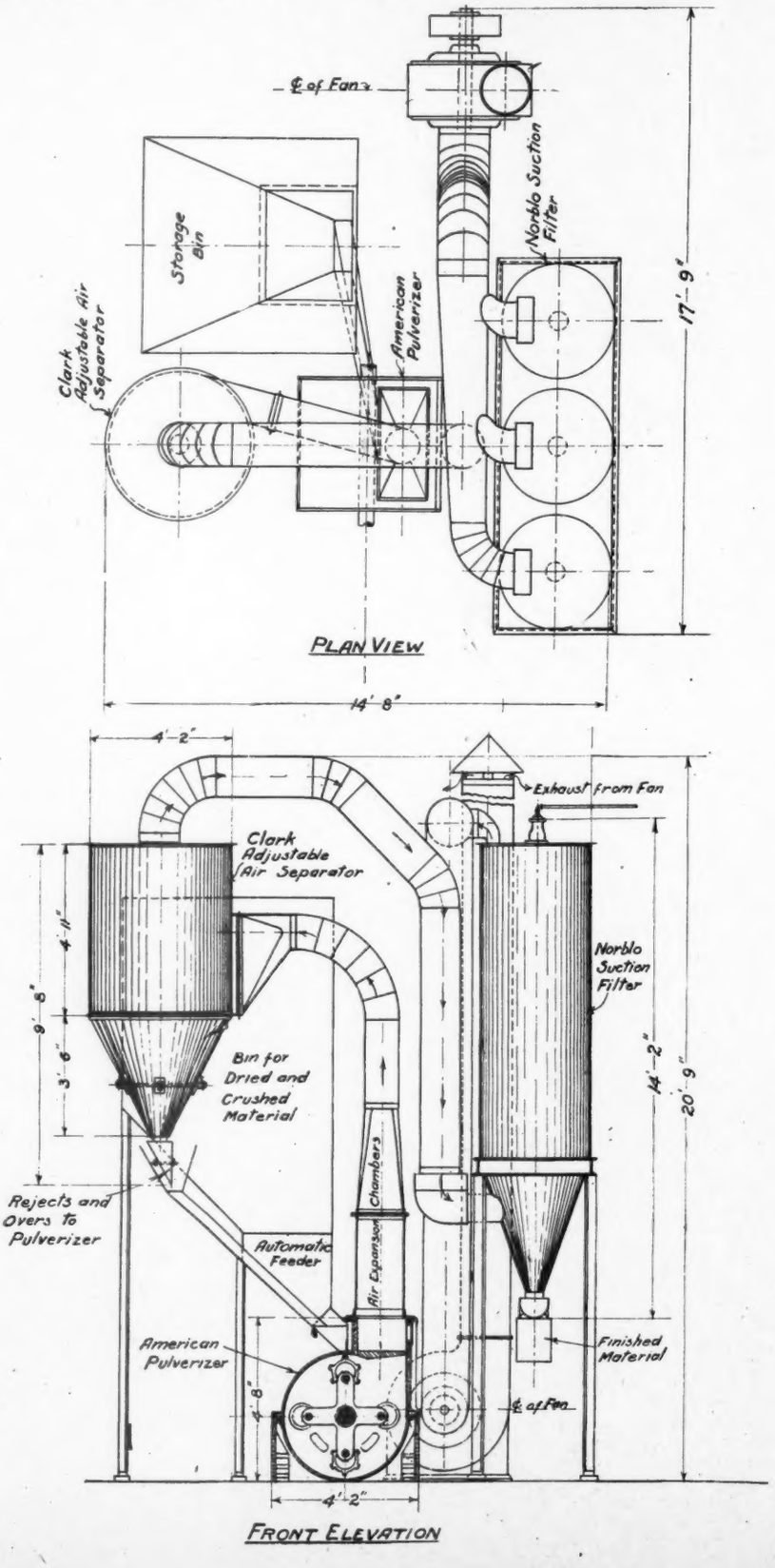
Co., St. Louis, makers of the new "Humanity" electric washing machine. This new machine is said to be easy to operate, and has no wood parts and no belts, chains or springs. It is made of copper, which is said to be particularly suitable for washing-machine construction. The cylinder is made with bell-shaped perforations to avoid the pulling out of buttons, ribbons, etc. The wringer may be used in any one of four positions and the motor has sufficient capacity to operate both the wringer and cylinder at the same time.

## Pulverized Coal Has Many Advantages.

For many years pulverized coal has been used, but only during the past few years has it been thought of seriously in manufacturing industries, except perhaps, in the burning of clinkers in cement mills. However, the manner of pulverizing, and the grade of pulverized coal in this industry, is open to vast improvements. The fineness of pulverized coal in the cement industry in general practice, is 90%, 100-mesh fine, but this is not enough. It should be pulverized for all industries, 90%, 200-mesh. A ton of 200-mesh will go further than a ton and a half of 90%, 100-mesh, although the cost of pulverization will be slightly increased. By tests it is proven that the finer material is not only more economical in securing highest heat units, but a better combustion is assured, also less ash to contend with as well as reduction in slag. The 200-mesh fine is also conveyed with less power, either by mechanical or pneumatic conveying systems, as the finer it is the more of a liquid nature it becomes. When blown in under furnaces, kilns, or boilers, it has a more gaseous qualification, which is an important and vital feature in perfect combustion, and naturally secures the highest efficiency of kilns, boilers, or furnaces.

Powdered coal, when properly burned, produces no smoke; thus, one of the solutions of the smoke nuisance.

In all processes employed in the pulverization of coal or any material, there are two very important points to be considered; i.e., horsepower per ton, and recovery of material. In addition to this, if certain fineness is desired at all times, or say, a classification of the material, it goes without saying that any appliance that can be adjusted so as to insure an even and uniform product has an advantage. The Clark Air Conveying, Separating, and Dust Collecting System has all of these qualifications; i.e., small horsepower, classification of the material, and the highest possible efficiency as to the recovery of material. The adjustable air separator can be so regulated that it will produce with the suction filter any percentage of fineness required. In a great many coal pulverizing plants, the most desired fineness, both on anthracite and bituminous coal is 90% through a 200-mesh screen. In several installations where this system is in successful operation there is produced 22% of sea coal, commonly called rejects or coarse, and 78% of fuel coal, ranging at all times within a very small fraction of a percent, or 90%, through 200-mesh. If 100-mesh material is desired the regulation can be made to produce it by the adjustments on the air separator, the suction filter being constructed with special type of straining surface, and the fan handling nothing but pure air. The fan also will operate at a less horsepower than a fan that is handling foul air containing a high percentage of dust. No suction filter is automatically cleaned, so that each set of bags is cleaned every 3 or 4 min., and with a pneumatic cleaning device which is operated automatically. During the cleaning period, which occupies about 3 or 4 sec., there is a reverse air valve that automatically reverses the air current on the section being cleaned. From the fact that no dust is pulled through the fan a long life of the fan is insured. All parts of the system are available and open for daily inspection. Any part that needs replacing is easily and readily repaired.



# ACTIVITIES IN THE TRADE

***Business Developments, Sales Agencies, Trade Literature and Miscellaneous Items Concerning Electrical Manufacturers and Allied Business Interests***

**The Advance Electric Co.,** St. Louis, has plans for the erection of a 1-story factory building, to cost about $15,000.

**Crocker-Wheeler Co.,** Philadelphia, will move from present quarters in the North American building, to 1209 Arch street, on or about Feb. 15. The Philadelphia office has been under the charge of Samuel Russell, Jr., since 1897.

**Edward Valve & Manufacturing Co.,** 72 West Adams street, Chicago, manufacturer of washing machines, is planning the erection of a new factory to replace the one in East Chicago, Ind., which was destroyed by fire.

**Rutenberg Electric Co.,** Marion, Ind., has increased its common stock to $250,000.

**Electrical Engineering Manufacturing Co.,** Pittsburgh, has leased space at 928 Penn avenue, for its local works.

**Warner Electric Co.,** Kalamazoo, Mich., manufacturer of electrical apparatus, has increased its capital stock to $50,000.

**United States Light & Heat Corp.,** Niagara Falls, N. Y., manufacturer of electric lighting and heating equipment, has issued special stock in the sum of $1,500,000.

**Michigan Brass & Electric Co.,** Lansing, Mich., has re-elected Claude L. Smith, president and treasurer of the company. Leo. G. Benson is vice-president and Harry R. Wright is secretary.

**H. C. Dodge, Inc.,** 32 Alger street, Boston, machinery manufacturer, has advised that some time ago it became the sole owner and manufacturer of the house-lighting system formerly marketed by Gray & Davis, Inc., Cambridge, Mass. This plant is now known as the "D-Light" house-lighting unit.

**Main Electric Co.,** Cleveland, has issued a revised price list, effective Feb. 15, covering its Main power-light plants. This is a supplement to bulletin No. 125, and shows considerable reductions in price on the various equipment manufactured by the company.

**George Cutter Works of Westinghouse Electric & Manufacturing Co.,** South Bend, Ind., has issued circular 7A-C-2 describing and illustrating the Westinghouse "Luxsolite" fixtures for street lighting. Style numbers and data on these fixtures, together with prices are given in this circular.

**National Steel Construction Co.,** 237 Fourth avenue, Pittsburgh, has acquired the local plant of the Bellwood Engineering Co. The new owner will remodel and extend the plant, and equip for the manufacture of electrical products to be used in connection with steel production.

**White Lily Manufacturing Co.,** Davenport, Ia., manufacturer of washing machines, has announced in a recent statement as to its financial condition that at the end of its fiscal year an inventory showed practically $400,000 more than it had the previous year. The company found its assets to be about two and one-half times the amount of its liabilities. Operations are now being conducted in the new plant and business is coming in better than it has for several months. The company makes the statement that it can see nothing but one of the biggest and best years for the "White Line" of washing machines ever experienced in its history.

**A. & B. Electrical Equipment Co.,** New York City, has leased space in the building at 126 East 23rd street, for a local works.

**Moser-Boeck & Co.,** Louisville, Ky., manufacturer of lighting fixtures, etc., was destroyed by fire Jan. 29. Surrounding property also was damaged, with loss estimated at about $50,000.

**Baltimore Electric Supply Co.,** Baltimore, has disposed of its property at Pleasant and Davis streets, with lease to the Terminal Warehouse Co. The site will be used for other industrial service.

**Knapp-Ritzmer Co.,** 248 East 35th street, New York City, electrical contractor, has increased its capital from $125,000 to $425,000.

**Westinghouse Lamp Co.,** Middletown, Conn., is arranging for the closing of its local plant at William and Hamlin street for an indefinite period. The company started operations here as the Franklin Lamp Co., in 1907, locating in Hubbard street; it took over the present plant in 1918. The factory has been giving employment to about 250 persons. Donald F. Way is superintendent.

**Thomas A. Edison Co., Inc.,** West Orange, N. J., manufacturer of electrical products, has filed notice of increase in capital from $2,000,000 to $3,000,000.

**Lionel Mfg. Co.,** 604-608 South 21st street, Irvington, N. J., manufacturer of electrically operated toys, batteries, etc., has had plans prepared for the erection of an addition, 60 by 90 ft.

**Maintenance Co.,** 417 Canal street, New York City, manufacturer of electrical equipment and operating an electrical contracting business, has acquired the six-story building at 449-53 West 42nd street for a consideration said to be $215,000. The structure will be used as a plant and the company's present establishment will be removed for this location as soon as necessary improvements are made.

**S. May,** Sixth avenue and 37th street, New York City, electrical dealer and contractor, has acquired the 5-story building with store, 24 by 99 ft., at 642 Sixth avenue, and a 4-story structure, 20 by 70 ft., adjoining. The property adjoins the present establishment of the purchaser, and will be altered and improved for occupancy.

**Brooks Electric Appliance Co.,** Davenport, Ia., has taken a lease on the rooms at 204 East 4th street and will open a modern equipped electrical merchandising and contracting house.

**Acme Wire Co.,** New Haven, Conn., has announced the opening of a Chicago office at room 1105, Monadnock block, 53 West Jackson boulevard, in charge of H. B. Bassett. The company also maintains branch offices at room 640 Guardian building, Cleveland, in charge of J. T. Crippen and in New York City, room 1203, 52 Vanderbilt avenue, in charge of H. S. Glasby.

**Roeper Crane & Hoist Works,** Reading, Pa., has issued catalog No. 50, applying to its Roeper electric hoists.

**Jeffery-DeWitt Insulator Co.,** Huntington, W. Va., held a banquet and christening ceremony celebrating the installation and lighting of the second kiln at its million-dollar Kenova, W. Va., plant. The company now employs 150 men and the plant covers an area of 13 acres. The new unit will double its capacity and under new arrangements an export business will be developed in France and Japan, necessitating a 30% increase in the company's personnel.

**Dudle Manufacturing Co.,** Fort Wayne, Ind., manufacturer of insulated wire and other electrical products, has purchased five acres of ground upon which to erect new buildings.

**Cutler-Hammer Manufacturing Co.,** Milwaukee, has issued publication No. 850, describing C-H electrically operated brakes. This booklet takes up shoe brakes for both direct and alternating current service. Tables give dimensions and ratings of each type of brake, and it is explained how the correct size of brake for any particular installation may be calculated. The direct current shoe brake is described as being very compact which allows an exceedingly simple design. Its rigid construction and few moving parts make it adaptable for the most severe service, such as that encountered on screw downs on steel mills. The alternating current brake operates by means of a rotating magnet, which largely eliminates noise and wear. The magnet does not seal, thereby insuring reliable operation. A disc brake adaptable to special installations is also described. Installation views of these brakes on cranes, hoists, elevators, and other machines are shown.

# PERSONAL MENTION

***Biographical Sketches and Chronicle of Changes in Business Connections, Promotions and Other Personal News of the Industry***

WILLIAM J. BARKER has been elected for the fifth time president of the Denver Motor Club. Mr. Barker is president of the Denver Gas & Electric Co.

J. B. HALEY has resigned as Illinois sales representative of the Kellogg Switchboard & Supply Co., to accept a position with the Pierce-Arrow Motor Co., Buffalo, N. Y.

CALVIN W. RICE, national secretary of the American Society of Mechanical Engineers, Davenport, Ia., was the speaker at the meeting held Feb. 8 of the Tri-City section of the society.

VICTOR W. HARTLEY has been appointed assistant secretary of the California Electrical Co-operative Campaign. Mr. Hartley was formerly advertising manager for the Sperry Flour Co.

W. F. MOSS, formerly manager of the New York office of H. M. Byllesby & Co., public utility securities, has become associated with Clark, Childs & Co., New York, engaging in a kindred line.

D. J. ANGUS, electrical engineer, Esterline Co., Indianapolis, recently gave an illustrated address on "Graphic Instruments and Their Uses," before the metermen's school at the University of Wisconsin.

CHARLES HACKEL has been appointed chief engineer of the Trenton (N. J.) & Mercer County Traction Co. Mr. Hackel was formerly connected with the Western Electric Co., New York City.

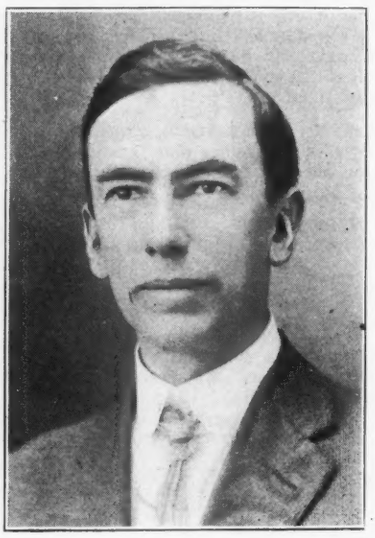
NOEL B. MARTIN has resigned as superintendent of the Sherman Electric Co. of Oregon, and will practice engineering in Lewiston, Idaho. Roy F. Dean of La Grande will succeed him as superintendent.

J. B. BASSETT of the General Electric Co. gave an interesting address before the Ocean Marine Engineers' Beneficial Association, 15 Whitehall street, New York, Feb. 1, on the subject of the Diesel electric drive.

ROBERT REYNOLDS ROBERTSON has joined the staff of the Society for Electrical Development, 522 Fifth avenue, New York. He was with the Winchester Repeating Arms Co. in an executive capacity in the manufacturing end of the business for 2½ years. When this concern was reorganized as the Winchester Co. he was transferred to the retail store department. In that position he located sites for the Winchester stores and assisted in the work of hiring and training personnel for the retail departments. He was appointed buyer for the specialties department for the chain of Winchester stores, and brings to the S. E. D. the experience gained in buying, retailing, displaying and advertising merchandise, which experience will be at the disposal of the society's members through the special service department.

JAMES T. MORAN, New Haven, Conn., has been re-elected president of the Southern New England Telephone Co., at the annual meeting, held Feb. 1.

FRANK CONRAD, consulting engineer of the Westinghouse Electric & Manufacturing Co., has been appointed assistant chief engineer. He has been connected with the Westinghouse organization for almost 30 years, having joined the company when it was in its first location at Garrison Alley, and this early affiliation gave him the opportunity of working for some of the great pio-



F. Conrad.

neers in the electrical industry, among them being Albert Schmidt and Philip Lange. Beginning with laboratory work in connection with measuring instruments, Mr. Conrad became associated with arc lamp design. One of the most important early developments was in connection with alternating-current measuring instruments, where his shop experience on construction of the Shallenberger ampere-hour meters and his experience with arc lamp mechanisms served him well. About this time the early work of Shallenberger on induction instruments was in progress. A feeding mechanism requirement for an a-c. arc lamp led Mr. Conrad to the idea of using an "induction type" or eddy-current operated disk for an arc lamp feed. This led directly to the original conception of the disk type induction indicating a-c. voltmeters and ammeters and what is still more important, the original "round type" Westinghouse watthour meter, which he designed and brought out in 1897, and which became the real foundation of the company's present extensive business in measuring instruments and metering devices. The radio apparatus developed by Mr. Conrad during the war was a great factor in the success of the activities of the navy and war departments.

A. C. STANNARD, formerly general traffic superintendent of the Chesapeake & Potomac Telephone Co., has been appointed general traffic manager of the Southwestern Bell Telephone System, with headquarters in St. Louis.

JAMES MACGUIRE, formerly chief inspector of power-plant equipment, Air Nitrates Corp., Muscle Shoals, Ala., is now master mechanic for D. P. Robinson & Co., Inc., and is located at the Colfax power station which that company is constructing for the Duquesne Light Co., of Pittsburgh.

GEORGE J. BLANTON, who for the past 4 yrs. has been connected with the engineering sales department of Chain Belt Co., Milwaukee, has been made New York district manager. Before joining the "Rex Family" in 1917, Mr. Blanton was associated with the General Electric Co. for 8 yrs., three of which were spent in Schnectady, N. Y., and the other five in the Milwaukee office. Mr. Blanton has had a broad experience in engineering sales work and has a wide knowledge of the chain industry. He is a graduate of the University of Michigan, Department of Mechanical and Electrical Engineering class of 1909.

CECIL W. MACKENZIE, right-of-way agent for the New York Telephone Co. at Buffalo, has made application for retirement under the company's pension plan. He has been in the service of the company for nearly 42 yrs. His interest in the telephone business began in 1876 when as a page at the Centennial Exposition in Philadelphia he witnessed the recognition given by Emperor Don Pedro, of Brazil, to Bell's invention which brought the telephone out of its obscurity and made it the sensation of the exposition. This incident aroused Mr. Mackenzie's desire to enter the telephone field and led him to become an operator in Buffalo's first telephone exchange on April 1, 1879, when there were less than 100 subscribers. He has witnessed the growth of Buffalo's telephone system from a few scattered telephones to a vast network of intercommunication comprising nearly 70,000 stations. He has observed and has been a part of the development of this business from the time when it was possible to telephone only a few miles until now when transcontinental telephone conversations are commonplace.

## OBITUARY.

CHARLES N. WURTH, Orange, N. J., an electrical associate of Thomas A. Edison for about 40 yrs., died at his home, 177 High street, Feb. 2. He was born in Switzerland in 1841.

JAMES C. LEGG, a member of the state public service commission, and former president of the Baltimore Chamber of Commerce, died, Feb. 1, at the Union Memorial hospital, Baltimore, from double pneumonia. He was 45 years of age. He is survived by his wife and one son.

# BUSINESS OPPORTUNITIES

***News of Electrical Construction Projects in All Parts of the Country, Proposals Invited, Foreign Trade Openings and New Companies***

## EASTERN STATES.

**Rockingham, Vt.**—The Vermont Academy, Saxtons river, will build a power house, 50 by 50 ft., in connection with a three-story dormitory building. The entire project will cost about $100,000.

**Amesbury, Mass.**—The Amesbury Electric Light Co. has made application to the Department of Public Utilities for permission to issue stock for $60,000 for extensions to property.

**Danvers, Mass.**—The department of mental diseases, State House, Boston, has commenced the erection of a power plant here for the local institution. The station, with equipment, will cost about $250,000. E. H. Porter Co., Peabody, Mass., has the building contract.

**Bridgeport, Conn.**—A power house and pumping plant will be erected by the Tide Water Oil Co. at its local plant on Bostwick avenue.

**Hartford, Conn.**—The Water Department is having plans prepared for the erection of a hydro-electric power plant to cost about $100,000, to be used for operations in connection with the filtration plant at West Hartford. Washing equipment, filter apparatus, etc., will be installed at the filtration plant. Caleb M. Saville, City hall, is general manager of the department.

**Amsterdam, N. Y.**—The Adirondack Power & Lighting Co., has broken ground for the construction of its proposed hydroelectric power plant on the Mohawk river, Clifton Park, near Albany, N. Y. The power station with machinery is estimated to cost in excess of $2,000,000. The company recently increased its capital from $13,800,000 to $23,100,000.

**Brooklyn, N. Y.**—The Brooklyn Edison Co., Inc., 13 Willoughby street, has had plans prepared for the erection of a one-story substation, 37 by 100 ft., at Livonia and Miller avenues, to cost about $30,000.

**Cambridge, N. Y.**—Fred P. Lovejoy has made application to the Public Service Commission for permission to build an electric power plant in the vicinity of Salem, Washington county, and for a distributing system to serve this section.

**Delancey, N. Y.**—The Delancy Electric Light Co., Inc., has petitioned for permission to construct an electric lighting plant here and for approval of exercise of franchise therefor.

**East Orange, N. Y.**—In a message to the city council, Mayor Charles H. Martens recommends immediate attention to the municipal street-lighting system, urging the installation of an improved "white way" system on Main street and other important thoroughfares.

**Mechanicsville, N. Y.**—The Half Moon Light, Heat & Power Co. has increased its capital from $200,000 to $300,000 for proposed expansion.

**New York, N. Y.**—New York & Ontario Power Co., care of Geo. E. Van Kennen, Ogdenburg, N. Y., has applied to the Federal Power Commission for license to construct a dam in the Little river or South channel of St. Lawrence river, between Ogden island and American shore at Waddington, N. Y.

**Mountaindale, N. Y.**—The Mountaindale Electric Light & Power Co. is planning for the construction of a power plant and distributing system at Fallsburg, Sullivan county. Application for permission has been made to the Public Service Commission.

**Old Forge, N. Y.**—The town will erect a municipal lighting and water plant, to cost about $50,000. Howard Powell is engineer. Wm. D. Morris is village clerk.

**Syracuse, N. Y.**—The Public Service Commission has granted permission to the Iroquois Utilities, Inc., City Bank building, to issue bonds for $145,500, to net $139,590. Of the proceeds, a sum of $83,300 will be used for the construction of a hydroelectric power plant on Cattaraugus creek, near Gowanda, N. Y.

**Millville, N. J.**—The Millville Electric Light Co. has tendered a proposal to the city council for furnishing service for lighting the streets of the municipality for a period of five years at a rate of $16,882 per annum.

**Westville, N. J.**—The West Jersey & Seashore Railroad Co., will make extensions and improvements in its local power plant, to include the installation of equipment for increased production.

**Carlisle, Pa.**—The board of county commissioners is planning for the establishment of a central power house and heating plant near the city limits, to be used for county institutions. Frank G. Fahnestock, Jr., Patriot building, Harrisburg, Pa., is architect and engineer.

**Chambersburg, Pa.**—The borough light department, Borough hall, will soon call for bids for the construction of a municipal electric light and power plant on Third street, to cost about $150,000, with machinery. A. C. Woods, Stock Exchange building, Philadelphia, Pa., engineer, is completing plans. J. H. Mowrey is head of the borough light department.

**Philadelphia, Pa.**—Harry Brocklehurst, 512 West Norris street, has filed plans for extensions and improvements in his power plant at 2332-4 North American street.

**Philadelphia, Pa.**—W. W. Hepburn, 1417 Pennsylvania building, is at the head of a project to construct a hydroelectric power plant in the vicinity of Schuyler, Va., estimated to cost about $60,000. Francis R. Weller, Hibbs building, Washington, D. C., is engineer for the project.

**Scranton, Pa.** — The Delaware, Lackawanna & Western Coal Co. has issued a call for bids for the construction of a three-story, brick, steel and reinforced-concrete addition to its electric power plant at Hampton, 34 by 74 ft., estimated to cost about $60,000. The extension will be equipped as a switching station, providing for the new 60,000-volt transmission line from the company's plant at Nanticoke to the power station at Hampton, a distance of about 22-mil. C. E. St. John is mechanical engineer for the company.

**Williamsport, Pa.**—W. D. and Walter Byron have plans under way for the construction of a one-story power plant for industrial service, estimated to cost about $50,000. Quigley Hafer, 155 Garfield street, Chambersburg, Pa., is engineer and architect.

**Baltimore, Md.**—The Wizard Check Indorser & Printing Machine Co., Calvert building, is completing plans for the power plant to be constructed in connection with a $300,000 manufacturing works in the Highlandtown district. F. S. Weiss is president. E. A. Fletcher, 407 North Charles street, is architect.

**Hamstead, Md.**—The Board of Carroll County School Commissioners, Court House, Westminster, Md., has completed plans for the construction of a three-story electric power plant at Hamstead, to be used in connection with school buildings in this section. M. S. H. Unger is head of the board.

**Monroe, Va.**—V. M. Bugg & Co. are planning for the establishment of an electric light and power plant for commercial service. Details and estimates of cost are being made.

**Tabor, N. C.**—The borough council has arranged for a bond issue of $25,000 for the establishment of an electric lighting plant. E. C. Watts, mayor, is in charge.

**Anderson, S. C.**—The Centerville Electric Lighting Co. has been incorporated. W. G. Gilmer is president and Theron S. Allen is secretary and treasurer.

**Charleston, S. C.**—The Charleston Railway, Gas & Electric Co. has filed notice of increase in capital from $5,000,000 to $5,500,000 for proposed expansion. Charles J. Bendt is secretary.

## NORTH CENTRAL STATES.

**Lima, O.**—The city is contemplating installing lights on West street, between Elm and High streets. Mayor Burkhardt is in charge.

**Wapakoneta, O.**—Forehlich & Emery, engineers, 403 Second National

Bank building, Toledo, have prepared plans for the rebuilding of the municipal lighting plant, for which bonds have been voted. The cost is estimated at $110,000. Harry Nagel is city superintendent.

**St. Joseph, Mich.**—The report of the curb lighting committee of the chamber of commerce, showing that 113 lighting units have been subscribed for and recommending prompt installation, was presented to the city council. Plans and specifications will be made up. Herman Balow is mayor.

**Bloomington, Ill.**—The Bloomington & Normal Railway & Light Co. has increased its capital stock from $1,800,000 to $2,900,000.

**Kewanee, Ill.**—The merchants are considering the question of boulevard lights on Tremont street. Address board of directors, chamber of commerce.

**Roscoe, Ill.**—The Roscoe Improvement Association has approved the installation of a new street lighting system. Work will be started at once.

**Eau Claire, Wis.**—An ordinance has been passed for the installation of a "white way" on Water street from Fourth to Fifth avenue. The Wisconsin-Minnesota Light & Power Co. has been instructed to install the lamp posts for the lights.

**Manitowoc, Wis.** — The Lincoln Highway Light Co. has been organized, for the purpose of furnishing light and power to farmers by tapping the city system.

**Merrill, Wis.**—The mayor will soon receive bids for the ornamental street lighting system to be installed by the city.

**Milwaukee, Wis.**—R. H. Pinkley, engineer, has prepared plans for the construction of an electric generating plant for the Milwaukee Electric Railway & Light Co., Public Service building.

**Kiester, Minn.**—Bonds in the sum of $6000 have been sold, for the erection of an electric lighting plant. G. M. Olenmeyer is city clerk.

**St. Cloud, Minn.**—L. P. Wolff, consulting engineer, St. Paul, has prepared plans for the erection of a steam electric power plant of 5000-kw. capacity, for the city. The cost is estimated at $750,000.

**Excelsior Springs, Mo.**—The Excelsior Springs Water, Gas & Electric Co. will build a transmission line extension to Liberty.

**Maplewood, Mo.**—Bonds in the sum of $12,000 have been authorized for the installation of electric lights on the main thoroughfare. Mr. Jones is city attorney.

**Rolla, Mo.**—Bonds in the sum of $25,000 have been voted to install power plant equipment. The mayor is in charge.

**St. Louis, Mo.**—The United Railways Co. has plans under way for the construction of four electric plants for traction service. The cost is estimated at $285,000. W. E. Bryan is superintendent.

**Tuscumbia, Mo.**—W. F. Banks has applied for a temporary permit to develop power on the Osage and Niangua rivers, to generate electricity for power, heat and light purposes in central Missouri.

**Warrensburg, Mo.**—The city has plans under way for the construction of a 12-mi. distribution system inside the city; an 8-mi. transmission line outside the city, and a power plant to be erected 8-mi. from the city. Frank L. Wilcox, Chemical building, St. Louis, is consulting engineer.

**Milford, Nebr.**—An election will be held to vote on the question of issuing $15,000 in bonds, for a municipal lighting plant.

**Watertown, S. D.**—Bonds in the sum of $200,000 have been voted for the erection of a lighting and power plant.

## SOUTH CENTRAL STATES.

**Chattanooga, Tenn.**—The Du Bois Tire & Rubber Co., 315 Volunteer Life building, has plans under way for the erection of a power plant, 42 by 60 ft., in connection with its tire manufacturing plant. The factory will cost in excess of $200,000. W. L. McLane, Volunteer Life building, is architect.

**Germantown, Tenn.**—The borough council is having plans prepared for the construction of an electric lighting plant in connection with a municipal waterworks. Gaines & Carlisle, Falls building, Memphis, Tenn., are engineers.

**Millington, Tenn.**—Gaines & Carlisle, architects, Falls building, Memphis, have prepared plans for the erection of an electric lighting and water plant, to cost about $20,000. Fred Clampit, care of Bank of Millington, is town clerk.

**Walton, Ky.**—The Reliance Engineering Co., 809 Fourth National Bank building, Cincinnati, has prepared plans for a municipal light plant, which is estimated to cost $13,000. Robert W. Jones is chairman of the light committee.

**Little Rock, Ark.** — The Arkansas Light & Power Co. will enlarge its plant capacity, and construct high-tension lines. The cost is estimated at $50,000. H. G. Couch is president.

**Pershing, Okla.**—The city has plans under way for the installation of a street lighting system. The mayor is in charge.

**Vinita, Okla.**—The Public Service Co. has plans under way for extensions and improvements in its local power plant for increased capacity. It is proposed to double the present output, with cost estimated at about $50,000.

**Amarillo, Tex.**—The city has plans under way for the extension of the lighting system, and the installation of 136 metal standards surmounted with groups of lights and globes.

**Ballinger, Tex.**—The city commission will erect a municipal electric light and power plant here. It has authorized the issuance of $60,000 of city warrants for the purpose.

**Dallas, Tex.**—Believing that electric current can be supplied at a lower cost than is now being charged by the Dallas Power & Light Co., Charles A. Mangold, vice-president of the Jefferson Hotel Co., declared that he would call a meeting at an early date, with the view of organizing a body of large consumers for the construction of a competitive plant in supplying current for commercial industrial purposes.

**Mercedes, Tex.** — The Mercedes Water, Light & Power Co. has been incorporated with a capital of $100,000. C. B. Witmer is interested.

**Plainview, Tex.**—The Texas Utilities Co. plans to extend its electric power transmission system to Tulia and Kress. It now furnishes power and lights to a number of towns in this part of the state. J. B. Scott is manager.

## WESTERN STATES.

**Rocky Ford, Colo.**—The Arkansas Valley Railway, Light & Power Co., in order to bring about double capacity of power delivery to the Arkansas valley, will start reconstruction of the electric power lines to Rocky Ford. The work will be started April 1 and is expected to be completed by July 1. The project together with the cost of the new 1000-kw. substation at Fowler, will cost about $80,000.

**Provo, Utah.**—The Keeler Electric Light Co. has been incorporated with a capital of $5000. The company proposes to operate an electric light and power line in the Spanish Fork and Salem districts. J. A. Walters is president.

**Vancouver, Wash.** — The realty board has passed a resolution favoring the installation of cluster lights, and a committee has been appointed to present the matter at the next meeting of the city council.

**Marshfield, Ore.**—An election will be held this month to vote on the question of issuing $110,000 in bonds, for the erection of a hydroelectric plant and for the purchase of the Bandon Power Co. district system.

**Los Angeles, Cal.**—The Department of Public Service, 603 Knickerbocker building, has made application to the Federal Power Commission for a preliminary permit to construct a dam, reservoir, conduit and power house on the south fork, Kern river, in Tulare and Kern counties.

**Redlands, Cal.**—C. E. Fairchild, 10 West Citrus avenue, has applied to the Federal Power Commission for a preliminary permit to construct four diversion dams, one reservoir, 7½-mi. of conduits and three power houses on Bear creek and Santa Ana river, San Bernardino county, California.

**Riverside, Cal.**—The Southern Sierras Co. has been formally authorized by the State Railroad Commission to float $444,260,000 in securities. The auxiliary plant will cost about $197,847 and the cost of the main plant is estimated at $642,354. The auxiliary plant will use an effective head of about 140-ft. and will have an installed generating capacity of about 250-kw. The main plant will have an installed generating capacity of 7500-kw., and will operate under a head of approximately 400-ft.

**San Francisco, Cal.**—The California State Railroad Commission has issued to the Southern California Edison Co.,

a certificate, under which it may proceed with a construction program to cost about $48,000,000, in reservoirs, conduits and power plants on the San Joaquin river and Big creek. The improvements include: Conduit from the Huntington lake to the Shaver lake; Florence lake reservoir of 43,000-acre ft. capacity; a new hydroelectric generating station, known as power house No. 1-a above the Shaver lake; Shaver lake reservoir of 138,000-acre ft. capacity, located on Stevenson creek; conduit from the Shaver lake reservoir to a generating station, to be known as power house No. 2-a; a third generating unit in the present power house No. 1 on Big creek, and enlargement of the hydroelectric generating station known as power house No. 8.

**San Francisco, Cal.** — The Great Western Power Co., 233 Post street, has applied to the Federal Power Commission for a preliminary permit to construct a dam and reservoir; 18-mi. conduit, and power house on the North fork of the Feather river, near Oroville, Butte county, California.

**San Francisco, Cal.**—The Southern Sierras Power Co., care of W. L. Huber, First National Bank building, has applied to the Federal Power Commission for a preliminary permit to construct five small diversion dams and conduits leading to two power houses at the headwaters of Snow creek, near Beaumont, Riverside county, California.

**Monterey, Mexico.**—The municipal authorities of San Andres Tuxtla are seeking to interest American capital in the construction of a large hydroelectric plant near here. It is stated that there is available for use a waterfall capable of generating 40,000-hp. and that the electrical energy could be transmitted to a number of thriving towns and cities in that region for industrial and domestic purposes.

## INCORPORATIONS.

**Philadelphia, Pa.**—C. D. Electric Co. Capital, $5000. Incorporators: F. W. Woodcock, C. A. McClure and others.

**Pittsburgh, Pa.**—Anchor Lite Appliance Co. Capital, $10,000. To manufacture electrical appliances. Incorporators: Saul J. Goldberg, Edward J. Kelsky and A. S. Goldstein, McDonald, Pa.

**Milwaukee, Wis.**—Electric Auto Signal Manufacturing Co. Capital, $25.000. Incorporators: John J. McJeskey, Harry W. Young and F. C. Volquorts.

**Painesville, O.**—Tinker Bros. Electric Co. Capital, $25,000. Incorporators: C. H. Tinker, M. L. Tinker and A. J. Few.

**New York, N. Y.**—C. & H. Menzer, Inc. Capital, $35,000. To manufacture electrical equipment and supplies. Incorporators: C. B. Bentz, C. Menzer and W. A. Van Ness, 200 Broadway.

**New York, N. Y.**—Kahn Hold-Up & Burglar Alarm Corp. Capital, $100,000. To manufacture electrically operated alarm systems and equipment. Incorporators: B. G. Kahn, M. Kahn and M. Hirschman, 113 East 24th street.

**Rockford, Ill.**—Rockford Power Machinery Co. Capital, $35,000. To manufacture electric rewinding machinery. Incorporators: Ray Brown, Charles B. Joyce and Perry C. Brown, 706 Seventh street.

**Chicago, Ill.**—Universal Lamp Co. Capital, $150,000. To manufacture electric lighting equipment, attachments and parts. Incorporators: Charles J. O'Connor, R. H. O'Connor and William H. Gallagher, 329 Plymouth court.

**Newark, N. J.**—Ideal Electric Manufacturing Co. Capital, $50,000. To manufacture electrical machinery and appliances. Incorporators: August and Joseph A. Harth, East Orange, and August Weiner, Jr., Newark.

**Caldwell, N. J.**—United Electric Co. has filed notice of organization and intent to engage in electrical contracting work with office at 360 Bloomfield avenue. John P. Campbell, 346 Bloomfield avenue heads the company.

**Baltimore, Md.**—The United Gas & Electrical Engineering Co. Capital, $100,000. To manufacture lamps, fixtures, etc. Incorporators: Philip Raun, Solomon Berkowich and others.

**Cleveland, O.** — The Progressive Electric & Engineering Co. Capital, $100,000. Incorporators: H. Flesher, E. J. Flesher, M. L. Dilley, E. Horvath and H. Bolotin.

**Hamilton, Ont.**—The Globe Code-Standard Electric Co. Capital, $40,000. To manufacture electric switches, etc. Incorporators: George W. Harper, Roy W. Baxter, Frederick J. Christmas and others.

**Buffalo, N. Y.**—Stapell Mumm Beals Corp. Capital, $10,000. To engage as electrical contractors. Incorporators: F. J. Mumm, W. H. Stanell and P. R. Beals.

**Clinton, Ill.**—Metz & Bowles, Inc. Capital, $25,000. To manufacture electrical equipment and metal products. Incorporators: Herman Metz, M. R. Metz and Edward J. Bowles.

**Jersey City, N. J.** — Caldwell & Corydon, 531 Washington avenue. To engage as electrical contractors. William E. Caldwell, 32 Beach street, Belleville, N. J., heads the company.

**Philadelphia, Pa.**—The Watts Co. Capital, $225,000. To manufacture electrical equipment. Incorporators: J. Vernon Pimm, F. R. Hansell and E. M. McFarland.

**Norfolk, Va.**—Bradley-Duffee Electric Co. Capital, $15,000. To engage as electrical contractors. Incorporators: L. L. Duffee and C. W. Bradley.

**Taunton, Mass.**—The Eaton Electric Furnace Co. Capital, $95,000. To manufacture electrically operated industrial furnaces. Incorporators: Harry B. Eaton and Edwin S. Hope, 3 Prospect street.

**Newark, N. J.**—Eclipse Electric Co., 232 West Kinney street. To engage as electrical contractors. Morris Eglowstein, 106 Ridgewood avenue, heads the company.

## PROPOSALS.

**Tarboro, N. C.**—The town commissioners will receive bids March 1 for $25,000, 6% electric light bonds. E. C. Watts is mayor.

**Chicago, Ill.**—Bids will be received Feb. 23, by I. Shapiro, secretary, West Chicago Park Commissioners, for 4000-lin. ft. of single conductor No. 6 lead covered cable and 1400-lin. ft. of three conductor No. 6 lead covered cable.

**Chicago, Ill.**—J. H. Eustade, architect, 123 South Michigan avenue, has prepared plans for the erection of a transformer building for the Peoples Gas, Light & Coke Co., estimated to cost $10,000. S. F. Insull is president. Bids will be received by architect.

**Redwood Falls, Minn.**—Bids will be received Feb. 24 by Wm. M. Smith, mayor, for the construction of an ornamental street lighting system, consisting of 88 single light posts; 16,200-ft. of No. 8 single conductor cable; 400-ft. of overhead line; one 15-kv-a. and one 20-kv-a. constant current transformer, and other apparatus.

**Washington, D. C.**—Proposals will be opened in the Treasury Department, supervising architect's office, Feb. 28, for furnishing and installing lighting fixtures in the U. S. post office and court house at Birmingham, Ala., in accordance with drawings and specifications, copies of which may be had at this office in the discretion of the supervising architect. Jas. A. Wetmore is acting supervising architect.

**Breckenridge, Minn.**—Bids will be received Feb. 28 for the rebuilding of the electric lines in this city. Address Robert H. Waite, city clerk.

**Redwood Falls, Minn.**—Bids will be received Feb. 24 for the construction of an ornamental street lighting system, including 88 single lighting posts; 16,200 lin. ft. of single conductor cable; 400 lin. ft. of overhead line; one 15 and one 20-kv-a. constant-current transformers and other apparatus. L. P. Wolff, construction engineer, 1000 Guardian Life building, St. Paul, Minn. H. C. Rutter, city clerk, Redwood Falls.

## FOREIGN TRADE.

*[Addresses of firms referred to in these trade opportunities may be obtained by writing to the Bureau of Foreign and Domestic Commerce, Washington, D. C., or its branch and local co-operative offices. Request for each opportunity should be on a separate sheet and the file number given.]*

**Fuse Wire** (34,314) — A firm of wholesale electrical dealers in India desires to receive quotations and information relating to resistance wire in sizes from No. 12 to 36 standard wire gauge, and also similar information on ordinary fuse wire. Quotations should be given c. i. f. Indian port.

**Electrical Appliances** (34,392) — A commercial agent in Spain desires to secure the representation of firms for the sale of electric stoves, electric machines for planing and polishing waxed floors, etc. References.

# FINANCIAL NEWS

***Comment on the Financial Outlook in the Electrical Industry, New Securities, Reports of Earnings, Dividends and Utility Stocks***

### Issue of Empire District Electric Co. Bonds.

Halsey, Stuart & Co., Chicago and New York, and Arthur Perry & Co., Boston, are offering an issue of The Empire District Electric Co., Joplin, Mo., first lien and general mortgage 8% gold bonds, due Nov. 1, 1949, at 100 and interest, yielding 8%. These bonds are the mortgage secured obligations of this company, which serves electricity for light and power to an area of approximately 1000 sq. mi. and a population of about 100,000, centering about Joplin, Mo.—a territory rich in agricultural and mineral resources and offering a large and diversified demand for power. The gross and net earnings increased in the last 6 yrs. 212% and 90% respectively. For the 12 mos. ended Oct. 31, 1920, gross earnings were reported as $2,532,939; net earnings $663,222. Annual interest requirements on the total mortgage debt, including this issue, is $327,965.

### Western States Gas & Electric Co.

The gross and net earnings of the Western States Gas & Electric Co. (Delaware) for the year ended Dec. 31, 1920, compared with those for the year ended Dec. 31, 1919, are as follows:

| | 1920. | 1919. |
|---|---|---|
| Gross earnings | $2,224,910 | $1,901,303 |
| Net earnings | 815,268 | 782,900 |

### Idaho Power Co. Bonds.

The Idaho Power Co. has sold $1,000,000 of first lien and general mortgage 7% bonds to the Harris Trust & Savings Bank of Chicago. The bonds are due Jan. 1, 1947, and are being offered at 94¼ and interest, yielding over 7½%.

### Potomac Electric Power Co.

The Potomac Electric Power Co., Washington, D. C., shows a gross revenue of $4,466,728.20, with total operating and other expenses of $3,933,909.85, leaving a surplus, prior to payment of dividends, of $532,818.35.

### Washington Railway & Electric Co.

The Washington Railway & Electric Co., Washington, D. C., has issued a report showing total receipts of $5,905,501.57 for the past year, with total operating expense and all other expense of $5,269,127.93, leaving a net income of $636,373.64, of which $425,000 has been paid out as dividends.

### Western United Gas & Electric Co.

Permission has been given by the Illinois Public Utilities Commission, Springfield, Ill., to the Western United Gas & Electric Co. to issue $350,000 general mortgage bonds.

### Southern California Edison Co.

The Southern California Edison Co. has been authorized by the state railroad commission to issue $10,000,000 general and refunding mortgage 6% twenty-five year gold bonds, and to use $3,000,000 of the bonds as collateral security for short time loans. The company intends to spend $8,000,000 for development this year, and expenditures for general additions and betterments range from $4,000,000 to $6,000,000.

### Carolina Power & Light Co.

| | 1920. | 1919. |
|---|---|---|
| November gross | $ 153,346 | $ 128,210 |
| Net after taxes | 43,681 | 36,567 |
| Total income | 46,690 | 38,342 |
| Surplus after charges | 28,914 | 22,449 |
| Twelve months' gross | 1,574,302 | 1,229,739 |
| Net after taxes | 436,456 | 398,131 |
| Total income | 610,261 | 557,138 |
| Surplus after charges | 403,034 | 365,093 |
| Balance after preferred dividends | 269,104 | 239,090 |

### Commonwealth Power, Railway & Light Co.

| | 1920. | 1919. |
|---|---|---|
| December gross | $2,982,950 | $2,589,016 |
| Net earnings | 1,121,344 | 1,093,413 |
| Surplus after fixed charges | 378,167 | 404,354 |
| Balance after preferred dividends | 288,402 | 314,589 |
| Twelve months' gross | 31,285,981 | 25,964,899 |
| Net earnings | 10,662,592 | 10,628,368 |
| Surplus after fixed charges | 1,874,918 | 2,419,128 |
| Balance after preferred dividends | 797,738 | 1,341,948 |

### Dayton Power & Light Co.

| | 1920. | 1919. |
|---|---|---|
| December gross | $ 400,659 | $ 332,819 |
| Net earnings | 93,256 | 123,911 |
| Total income | 94,417 | 127,123 |
| Surplus after charges | 44,630 | 32,034 |
| Balance after preferred dividends | 26,738 | 14,656 |

### Blackstone Valley Gas & Electric Co.

| | 1920. | 1919. |
|---|---|---|
| December gross | $ 290,909 | $ 262,280 |
| Net earnings | 76,239 | 81,653 |
| Surplus after charges | 48,726 | 56,541 |
| Twelve months' gross | 3,266,907 | 2,647,059 |
| Net earnings | 907,156 | 721,234 |
| Surplus after charges | 599,829 | 424,295 |

### Northern Texas Electric Co.

| | 1920. | 1919. |
|---|---|---|
| December gross | $ 343,770 | $ 329,540 |
| Net earnings | 108,905 | 136,244 |
| Surplus after charges | 83,467 | 111,380 |
| Twelve months' gross | 3,951,650 | 3,387,854 |
| Net earnings | 1,415,512 | 1,352,936 |
| Surplus after charges | 1,115,743 | 1,053,504 |

### Houston Electric Co.

| | 1920. | 1919. |
|---|---|---|
| December gross | $ 342.134 | $ 277.168 |
| Net earnings | 97,564 | 71,823 |
| Surplus after charges | 62,545 | 36,669 |
| Twelve months' gross | 3,808,953 | 3,095,151 |
| Net earnings | 1,126,505 | 819,016 |
| Surplus after charges | 704,449 | 404,294 |

### Manila Electric Railroad & Lighting Corp.

| | 1920. | 1919. |
|---|---|---|
| December gross | $ 315,397 | $ 275,949 |
| Net after taxes | 118,791 | 65,207 |
| Total income | 118,993 | 65,988 |
| Surplus after charges | 83,936 | 31,014 |
| Twelve months' gross | 3,418,435 | 2,593,951 |
| Net after taxes | 1,213,213 | 794,449 |
| Total income | 1,214,167 | 796,911 |
| Surplus after charges | 802,381 | 473,395 |
| Balance after preferred dividends | 502,381 | 173,395 |

### Cities Service Co.

| | 1920. | 1919. |
|---|---|---|
| December gross earnings | $1,826,493 | $1,757,622 |
| Net after taxes | 1,765,889 | 1,696,033 |
| Surplus after charges | 1,591,568 | 1,154,675 |
| Twelve months' gross | 24,698,039 | 19,977,550 |
| Net after taxes | 23,997,566 | 19,273,715 |
| Surplus after charges | 22,055,938 | 17,350,854 |

### Reading Transit & Light System.

| | 1920. | 1919. |
|---|---|---|
| November operating revenues | $235,402.71 | $228,338.68 |
| Operating expenses, taxes and rentals. | 213,700.54 | 197,227.46 |
| Operating income. | $ 21,702.17 | $ 31,111.22 |
| Amount of maintenance expenditures included in above operating expenses | $ 29,996.35 | $ 49,755.87 |

### Dividends.

| | Term. | Rate. | Payable. |
|---|---|---|---|
| Brooklyn Edison | Q | $2.00 | Mar. 1 |
| Cities Service | Mo. | .368 | Mar. 1 |
| Phila. Elec., com | Q | 1.75% | Mar. 15 |
| Phila. Elec., pfd | Q | 2% | Mar. 15 |
| S. D. Con. G. & E., pf. | Q | 1.75% | Jan. 15 |
| San Joaquin L. & Pr., pfd. | Q | 1.75 | Mar. 15 |
| Tampa Electric | Q | 2.50 | Feb. 16 |
| Texas Pr. & Lt., pfd. | Q | 1.75% | Feb. 1 |

WEEKLY COMPARISON OF CLOSING-BID PRICES OF SECURITIES OF LEADING ELECTRICAL COMPANIES.

Quotations furnished by F. M. Zeiler & Co., Rookery Bldg., Chicago.

| Public Utilities— | Div. rate. Per cent. | Bid Feb. 8. | Bid Feb. 15. |
|---|---|---|---|
| Adirondack Electric Power of Glens Falls, common | 6 | 13 | 13 |
| Adirondack Electric Power of Glens Falls, preferred | 6 | 72 | 72 |
| American Gas & Electric of New York, common | .. | 10? | 99 |
| American Gas & Electric of New York, preferred | 6 | 37 | 37 |
| American Light & Traction of New York, common | .. | 89 | 92 |
| American Light & Traction of New York, preferred | 6 | 71 | 79 |
| American Power & Light of New York, common | 4 | 45 | 45 |
| American Power & Light of New York, preferred | 6 | 65 | 64 |
| American Public Utilities of Grand Rapids, common | .. | 8 | 9 |
| American Public Utilities of Grand Rapids, preferred | 7 | 18 | 19 |
| American Telephone & Telegraph of New York | .. | 99 | 100 |
| American Water Works & Elec. of New York, common | .. | 3 | 3 |
| American Water Works & Elec. of New York, particip | 7 | 6 | 6 |
| American Water Works & Elec. of New York, 1st preferred | .. | 39 | 40 |
| Appalachian Power, common | .. | 3 | 3 |
| Appalachian Power, preferred | 7 | 20 | 21 |
| Cities Service of New York, common | +extra | 254 | 254 |
| Cities Service of New York, preferred | 6 | 68 | 69 |
| Commonwealth Edison of Chicago | 8 | 105 | 106 |
| Comm. Power, Railway & Light of Jackson, common | .. | 13½ | 14 |
| Comm. Power, Railway & Light of Jackson, preferred | 6 | 34 | 34 |
| Federal Light & Traction of New York, common | .. | 6 | 6 |
| Federal Light & Traction of New York, preferred | .. | 42 | 42 |
| Northern States Power of Chicago, common | .. | 43 | 46 |
| Northern States Power of Chicago, preferred | ex.div.7 | 79 | 79 |
| Pacific Gas & Electric of San Francisco, common | .. | 48 | 48 |
| Public Service of Northern Illinois, Chicago, common | 7 | 76 | 75 |
| Public Service of Northern Illinois, Chicago, preferred | 6 | 80 | 81 |
| Standard Gas & Electric of Chicago, common | .. | 12¼ | 12½ |
| Standard Gas & Electric of Chicago, preferred | 8 | 35 | 35 |
| Tennessee Railway, Light & Power of Chattanooga, common | .. | 1 | 1 |
| Tennessee Railway, Light & Power of Chattanooga, preferred | 6 | 5 | 5 |
| Western Power of San Francisco, common | .. | 23 | 25 |
| Western Union Telegraph of New York | extra | 81 | 88 |
| Industrials— | | | |
| Electric Storage Battery of Philadelphia, common | 4 | 98 | 99 |
| General Electric of Schenectady | 8 | 127 | 128 |
| Westinghouse Electric & Mfg. of Pittsburgh, common | 7 | 45 | 45 |